

# **THE BASIS AND NATURE OF ATTITUDES TOWARD ANIMAL USE: A PSYCHOLOGICAL APPROACH**

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Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.

## **ACKNOWLEDGEMENTS**

This PhD project started in January 2001. It was inspired by the media coverage of the fox hunting debate that led to me to wonder at the complex nature of attitudes toward animals and animal use. At our local riding stables there was a divide on the issue of fox hunting between a group of people who were otherwise friends and shared many of the same attitudes, beliefs and values concerning animals. The range of views was diverse and mostly passionate, with some people fiercely supportive of fox hunting and some strongly against, whilst others were somewhat indifferent toward the subject. This conflict between individuals was interesting, but perhaps even more so was the apparent disparity of the arguments that individuals presented. For example, the same person (a supporter of hunting) described the fox as cunning, wily, intelligent, yet on the other hand rejected the idea that these animals might experience pain, fear and suffering when hunted. Later discussions with friends concerning animal use revealed further discrepancies in people's views. For instance, the practice of breeding pigs for human transplants was often described as repulsive, yet breeding pigs for food was deemed acceptable. Incongruent attitudes toward the use of animals provided the focus for the six studies reported in this thesis.

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**“Man is an intellectual animal, and therefore an everlasting contradiction to himself. His senses centre in himself, his ideas reach to the ends of the universe; so that he is torn in pieces between the two...”**

**William Hazlitt (1778 - 1830) English writer, essayist**

**“The greatness of a nation and its moral progress can be judged by the way its animals are treated”**

**Mahatma Gandhi (1869-1948)**

## **ABSTRACT**

The human-animal relationship is a peculiar one. On the one hand we, the British public, are often described as a nation of animal lovers, whilst on the other hand, we allow for the use of large numbers of animals in ways that often entail discomfort and death to those animals involved. Seemingly disparate attitudes toward animal use are common, both inter- and intra- individuals and groups (Podberscek, Paul & Serpell, 2000). Yet whilst factors that underlie views on animal use are psychological in nature (Plous, 1993; Serpell, 2004), social scientists have only just begun to explore the origins of these attitudes (Matthews & Herzog, 1997). Existing research has mostly focused on variables such as gender and personality in order to understand the variance in people's attitudes; these account for a significant, but small, proportion (around 5-10%) of such variance. Instead, the aims of the present project were to understand the basis and nature of attitudes toward animal use by examining the perceptions and beliefs that underlie these views. Comprising six studies that combine quantitative and qualitative methodologies, samples included laypersons (Studies 1-3), students (Study 4), and those involved with animal use issues: scientists involved with the use of animals for medical research and animal welfare persons (Studies 5 & 6). Findings revealed psychological factors that account for up to 65% of the variance in views on animal use, and confirmed was a causal relationship between belief in the existence of alternatives to using animals and attitudes toward animal use. Most important are beliefs concerning: the benefits of medical research, animal rights, the existence of alternatives, the relative importance of human versus animal needs, equality and social recognition. These factors explain incongruent attitudes held inter- and intra- individuals and groups. Findings from this research will appeal to various communities such as scientists and animal welfare persons wishing to engage laypersons and gain support for their work, and academics interested in attitudes and attitude change.

# List of Contents

<b>Chapter 1</b>	<b>A NEW APPROACH TO UNDERSTANDING THE BASIS AND NATURE OF ATTITUDES TOWARD ANIMAL USE</b>	<b>1</b>
	References	10
<b>Chapter 2</b>	<b>STUDY 1: ATTITUDES TOWARDS ANIMAL USE AND BELIEF IN ANIMAL MIND</b>	<b>12</b>
	Abstract	13
	Introduction	14
	Method	21
	Results	23
	Discussion	29
	Conclusions	34
	References	35
<b>Chapter 3</b>	<b>STUDY 2: ATTITUDES TOWARD ANIMAL USE: A GROUNDED THEORY APPROACH</b>	<b>40</b>
	Abstract	41
	Introduction	42
	Method and Analysis	44
	Results and Discussion	46
	Conclusions	62
	References	63
<b>Chapter 4</b>	<b>STUDY 3: PSYCHOLOGICAL FACTORS UNDERLYING ATTITUDES TOWARD THE USE OF NON-HUMAN ANIMALS</b>	<b>66</b>
	Abstract	67
	Introduction	68
	Method	74
	Results	79
	Discussion	84
	Conclusions	93
	References	94
<b>Chapter 5</b>	<b>STUDY 4: ATTITUDES TOWARD THE USE OF ANIMALS FOR MEDICAL RESEARCH AND DISSECTION: CAN WE CHANGE THEIR MINDS?</b>	<b>97</b>
	Abstract	98
	Introduction	99
	Method	100
	Results	104
	Discussion	106

	Conclusions	109
	References	110
<b>Chapter 6</b>	<b>STUDY 5: FACTORS UNDERLYING ATTITUDES TOWARDS ANIMAL USE: A STUDY OF SCIENTISTS AND ANIMAL WELFARE PERSONS</b>	<b>111</b>
	Abstract	112
	Introduction	113
	Method	126
	Results	136
	Discussion	150
	Conclusions	159
	References	161
<b>Chapter 7</b>	<b>STUDY 6: DETERMINANTS OF CONFLICT BETWEEN SCIENTISTS AND OPPONENTS OF ANIMAL RESEARCH</b>	<b>168</b>
	Abstract	169
	Introduction	170
	Method	179
	Results	186
	Discussion	204
	Conclusions	216
	References	218
<b>Chapter 8</b>	<b>ATTITUDES TOWARD ANIMAL USE: SUMMARY AND GENERAL DISCUSSION</b>	<b>223</b>
	References	242
<b>APPENDICES</b>		<b>244</b>
	Appendix I	245
	Appendix II	249
	Appendix III	258
	Appendix IV	261
	Appendix V	270
	Appendix VI	288
	Appendix VII	292
	Appendix VIII	313

## List of Figures

<b>Chapter 3</b>	Figure 3.1. Attitudes Toward Animal Use: A Model	48
<b>Chapter 6</b>	Figure 6.4.1. Belief in animal cognition for thirteen species of animals	145
	Figure 6.4.2. Belief in animal sentience for thirteen species of animals	146
	Figure 6.5.1 Belief in animal cognition for different species across groups	147
	Figure 6.5.2. Belief in animal sentience for different species across groups	148
<b>Chapter 7</b>	Figure 6.1. Group differences in relation to Function 1 and 2	200
<b>Chapter 8</b>	Figure 8.1. Inter-relating factors that most influence attitudes toward animal use	231

## List of Tables

<b>Chapter 2</b>	Table 2.1. Correlations between specific forms of animal use	23
	Table 2.2. Mean scores representing specific forms of animal use	24
	Table 2.3. Relationships between belief in animal mind (BAM), participant variables, and attitudes towards animal use	25
	Table 2.4. Relationships between participant variables and BAM	28
<b>Chapter 3</b>	Table 3.1. Themes that explain attitudes toward different types of animal use	46
<b>Chapter 4</b>	Table 4.1. Items measuring attitudes towards animal use and internal reliability of categories	76
	Table 4.2. Factors (and eigenvalue) underlying attitudes	78
	Table 4.3. Impact of each factor on models predicting attitudes	80
	Table 4.4. Correlations between attitudes towards different types of animal use	82
	Table 4.5. Mean scores for attitudes towards different ways in which animals are used	83
<b>Chapter 5</b>	Table 5.1. Perceptions of choice across manipulation types	102
	Table 5.2. Attitudes toward animal use across manipulation types	104
<b>Chapter 6</b>	Table 6.1. Comparing personal characteristics across organisations	127
	Table 6.2. Mean scores for 'belief in animal mind' and attitudes toward animal use	135
	Table 6.3. Between-groups differences for all dependent variables	139

<b>Chapter 7</b>	Table 7.1. Perceptions and beliefs concerning animals and their use in medical research	173
	Table 7.2. Participant characteristics across groups of participants	180
	Table 7.3. Attitudes toward animal use for medical research across groups	187
	Table 7.4. Median scores (and CROs), chi square values and Spearman's rho examining factors underlying attitudes toward using animals for medical research	188
	Table 7.5. Mean scores (and standard deviations), F values and Pearson's r for empathy toward humans and animals across groups	190
	Table 7.6. Median scores, CROs, chi square and Spearman's rho examining terminal values across groups and in relation to attitudes toward medical research	193
	Table 7.7. Median scores, CROs, and chi square examining instrumental values across groups, and correlations between values and attitudes toward medical research	196
	Table 7.8. Between-groups differences for predictor variables (ordered by the magnitude of their contribution to Function 1) and standardized canonical discriminant functions	199
	Table 7.9. Correct and incorrect group classification (%) of participants	201
	Table 7.10. Between-groups differences for predictor variables (ordered by the magnitude of their contribution to function 1) and standardized canonical discriminant functions	202
	Table 7.11. Correct and incorrect group classification (%) of participants	203
<b>Chapter 8</b>	Table 8.1. Factors that underlie attitudes toward animal use	229

## CHAPTER 1

### A NEW APPROACH TO UNDERSTANDING THE BASIS AND NATURE OF ATTITUDES TOWARD ANIMAL USE

The term 'animal use' refers to a wide range of practices that involve the use of (non-human) animals<sup>1</sup> by human beings. Killing animals for their skin, hunting for sport, and using animals for medical research are all examples of such. Animal use practices can be both topical and controversial, and newspapers and television regularly report and question practices such as fox hunting, cloning, and breeding animals for human transplants. These provoke a range of responses from the extreme to the indifferent, and attitudes toward animal use can be passionate, complex, and paradoxical. For example, supporters of animal rights have been recently jailed for campaigns that have included hate mail, hoax bombs, and arson attacks, and also the desecration of the grave of a woman whose family bred guinea pigs for medical research (Britten, 2006). Yet despite threats to themselves, their colleagues, and their families, scientists continue to conduct research that involves using animals. Seemingly disparate attitudes toward animal use are also common intra-individuals and groups (Podberscek, Paul & Serpell, 2000). For example, the same person can be repulsed by the killing of wild animals for their skin or for ivory and disagree with fox hunting as a sport, yet participate in fishing as a hobby and support medical research that causes discomfort and death to those animals involved.

The person who supports one kind of animal use but is opposed to other types is not unusual; attitudes toward animal use can be both complex and incongruent. There are many instances where the human-animal relationship appears contradictory and inconsistent. For example, there is the scientist who is fond of animals yet chooses a career in animal testing,

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<sup>1</sup> Whilst we recognise that human beings are animals, from this point onwards in this thesis the term *animal* is used to mean all species other than human.



the dog lover who participates in fox hunting, or the person who will eat factory farmed meat but not veal. These are all real-life examples of the peculiar relationship between humans and animals. On the one hand we, the British public, are often described as a nation of animal lovers, whilst on the other hand, we allow for the use of large numbers of animals in a range of ways that often entails pain, discomfort and death for those animals concerned. For example, in 2005 a total 2.8 million animals were used for research in the UK alone (Home Office, 2006). Clearly, the subject of animal use presents a dilemma, since procedures such as medical research can lead to high value benefits such as the development of vaccines and cures for serious human diseases, but at the same time cause suffering to the large numbers of animals involved. When the stakes are so high, it is easy to see how people become passionate in their views. But what is it that divides people on their attitudes toward animal use and drives some people to extremist behaviour, whilst others remain indifferent toward the topic of animal use? And how can one person support some kinds of animal use whilst fiercely opposing others? In order to answer these questions, the basis and nature of attitudes toward animal use must be understood.

This PhD comprises a series of six research studies that aim to address these questions by examining people's attitudes toward animal use and the factors that underlie these views. The starting point for this project was to examine what is already known about people's views on this subject. Whilst this is a relatively new area of research, there has been a growth of interest in this topic since the 1980's. Three main points were observed about the existing research in this area. First, studies have tended to assess attitudes as uni-dimensional or focus on attitudes toward one specific type of use, rather than compare attitudes toward different types of animal use (e.g., Armstrong & Hutchins, 1996; Mathews & Herzog, 1997). Second, most research has involved quantitative methods and included non-representative samples. And third, attitudes have been

examined mainly in relation to personal characteristics, such as gender, personality, age, religious orientation, political stance, living area, and so on (e.g., Bowd, 1984; Driscoll, 1992; Furnham & Pinder, 1990; Herzog & Galvin, 1997; Kellert, 1980; Kellert & Berry, 1981; Matthews & Herzog, 1997; Plous, 1996; Rajecki, Rasmussen & Craft, 1993; Sperling, 1988; Wells & Hepper, 1997). In response to these observations, I propose that: (i) people's attitudes are likely to vary depending upon the type of animal use in question; (ii) a multi-method approach that includes more representative samples will provide a more complete understanding of attitudes towards animal use than exists at present; and (iii) attitudes are related to psychological characteristics such as a persons perceptions and beliefs concerning animals and animal use.

Indeed, whilst findings from previous research have shown a consistent relationship between attitudes and variables such as gender and personality, these account for a significant, but small, amount of the variance in attitudes; usually around 5-10% (Driscoll, 1992). This indicates that whilst these variables are important, there are other factors that need to be identified that will play a larger role in influencing, or underlying, attitudes towards animal use. Furthermore, whilst in the past quantitative and qualitative approaches have been seen as incompatible, more recently others propose a more holistic view of the process of social research where different methodologies can be complimentary since each have a variety of contributions to make (Bauer, Allum, & Gaskell, 2000). Different methods may enable corroboration between studies and identification of commonalities and differences between different groups of people. Further, by using a range of methodologies to collect and analyse data, weaknesses in one type of methodology can be counterbalanced by the strengths of another method. For example, whilst qualitative methods can provide data more intensive than questionnaires but can only be realistically conducted on small samples, questionnaires allow data collection from much larger groups of people. Hence, the present project

applies a variety of methodological approaches in order to understand the nature and basis of attitudes toward animal use.

Findings from research in this area have important implications and will appeal to various communities. They may be used to inform: (i) psychologists about the nature of attitudes and beliefs, both animal-related and in more general theoretical terms; (ii) professionals working in the field of animal maltreatment and abuse; (iii) scientists who encounter opposition to their work involving research on animals; (iv) professionals interested in the link between empathy toward humans and empathy toward animals; and (v) politicians and policy makers interested in public attitudes towards animal-related issues. Below is an overview of the six studies that constitute this thesis.

### **Study 1: Attitudes Towards Animal Use and Belief in Animal Mind**

Previous studies have described attitudes toward animal use as uni-dimensional (e.g. Armstrong & Hutchins 1996; Matthews and Herzog 1997), rather than comparing attitudes towards different types of animal use. Research has also tended to focus on participant characteristics such as gender and age in order to explain why people have different views on the subject of animal use. Moving away from this focus, Hills (1995) studied a psychological factor referred to as 'belief in animal mind'. This is the term used to describe the attribution of mental states to animals, from a fairly straightforward ability to experience pain, distress, and anxiety, to higher mental processes such as decision-making processes, problem-solving, and self-awareness (see Eddy, Gallup, & Povinelli, 1993; Herzog & Galvin, 1997; Hills, 1995). Research has demonstrated that the more we believe in the mental abilities of animals, the less we support animal use (Herzog & Galvin, 1997; Hills, 1995). For example, some animal rights supporters argue that the use of animals is morally wrong simply on the grounds that animals are capable of experiencing pain and suffering, and therefore we should not force them to be involved in acts that inflict pain

and suffering upon them (e.g. Singer, 1975). Conversely, by emphasising that animals are different to humans in terms of their levels of awareness, or capacity to have thoughts and feelings, we can justify poor treatment of animals by portraying animals as incapable of thoughts and feelings (Herzog & Galvin, 1996).

As a starting point for this series of six studies, Study 1 of this thesis differed from previous research in that it compared attitudes toward different types of animal use, and examined these in relation to belief in animal mind as well as a number of personal characteristics such as gender and age. The first aim of this study was to establish whether attitudes are uni-dimensional (as previous research has suggested) or whether attitudes vary depending upon the type of animal use in question (as I propose). The second aim was to examine belief in animal mind and other factors in relation to attitudes toward different types of animal use. Results would establish whether some types of animal use are supported more than others and whether factors underlying attitudes vary depending upon the type of animal use in question. Also, the relative impact of belief in animal mind and other factors in relation to attitudes toward different types of animal use might be confirmed.

### **Study 2: Attitudes toward animal use: A Grounded Theory approach**

It is proposed that factors underlying attitudes toward animal use can be examined within the framework of cognitive dissonance theory. This term describes the psychological discomfort experienced due to a perceived discrepancy within a person's thinking and behaviour (Festinger, 1957; Baumeister, 1982; Cooper & Fazio, 1984; Smith & Mackie, 1995). When a person recognises an inconsistency in their thoughts and actions, for example, the animal laboratory technician who perceives himself as an animal lover but must inflict pain on research animals under his care, this is often accompanied by uncomfortable feelings concerning this inconsistency. In order to overcome or reduce this discomfort, a shift in

that persons thinking or behaviour is needed so that the discrepancy is eradicated. In the example of the laboratory technician, there are a variety of ways in which this is possible. They may change their behaviour so that it is consistent with their affection for animals (e.g., give up their job), or alternatively they may demonstrate a shift in their thinking in order to justify or make sense of this inconsistency. For example by seeking to justify their work ("my research will lead to high value benefits for a large number of people"), or by denying that animals have the capacity to suffer ("animals don't feel pain like we do").

Since Study 1 examined how attitudes might vary toward different types of animal use, Study 2 took a bottom-up approach using qualitative methods to examine the ways in which people make sense of and justify variance in their views. It was proposed that by identifying the kinds of justifications people use when theorising about their attitudes toward animal use (i.e., underlying factors), we can start to understand how different people hold opposing views on the subject, and how individuals are capable of holding seemingly contradictory attitudes. Interview methods that encourage participants to rationalise their views on animal use were used, in order to identify psychological factors that underlie views on this subject. Findings would reveal which perceptions and beliefs underlie attitudes toward animal use.

### **Study 3: Psychological factors underlying attitudes toward the use of non-human animals**

The bottom-up approach used in Study 2 enabled the identification of psychological factors that had not previously been considered by researchers interested in attitudes towards animal use. These findings, based on intensive data from a small number of participants, provide the basis for Study 3. This third study involves the design and development a questionnaire that will enable further examination of psychological factors. The aims of this study were to gain quantitative evidence for the factors

identified in Study 2 from a larger sample of participants, and to determine which factors were most relevant in relation to attitudes toward different types of animal use. The factor that most contributes to variance in views on animal use will provide insight into how attitudes might be changed, and will hence become the focus of the subsequent study.

#### **Study 4: Perceived alternatives to using animals and attitudes toward animal use: An experimental study**

Previous research tends to use correlations as evidence of a relationship between attitudes toward animal use and underlying factors. Instead, Study 4 used experimental methods to manipulate one of the psychological factors found to be important in the preceding study, and then measure views on animal use, in order to identify a causal relationship between this factor and attitudes toward the use of animals. The aims of this study were to determine whether factors underlying attitudes might be manipulated, and if this would have an effect on their views on animal use. Findings from this research will be of interest to those interested in attitudes toward animal use, and those interested in attitudes in general. It can inform us as to whether attitudes can be changed and potentially provide a method for doing so. Hence, findings will have important implications for those wishing to persuade people to support a particular view on animal use issues.

#### **Study 5: Factors underlying attitudes towards animal use: A study of scientists and animal welfare persons**

Although it is likely that scientists involved in animal research and animal welfare persons will have opposing attitudes towards animal research, it is not known whether this will extend to other forms of animal use. For example, do scientists who support using animals for research show more support for other types of animal use compared to animal welfare persons? Also, little is known about the attitudes and beliefs of scientists concerning their belief in animal mind, and other factors that might

underlie their views. Study 5 addresses the lack of research in this area, by comparing the views, perceptions and beliefs of laypersons with those involved with animal use issues: scientists who are members of organisations that promote the use of animals for medical research and members of animal welfare organisations. Attitudes toward different types of animal use were compared and psychological factors identified in Studies 2 and 3 were examined. Also examined was belief in animal mind (cognition and sentience) for different types of animals. The aims were to identify between-groups differences in belief in animal mind for different kinds of animals, to understand how people can hold polarised views on the subject of animal use, and to determine how these differ from the views of laypersons.

#### **Study 6: Determinants of conflict between scientists and opponents of animal research**

Study 6 examines all of the factors identified in Studies 1-5 in relation to attitudes specifically toward the use of animals for medical research, with a sample of scientists, animal welfare persons, and a control group. In order to examine whether different factors have a different impact on the views of different groups of participants, a ranking task was used to identify the relative weighting of each factor in relation to attitudes toward animal use. Also examined was the role of empathy (toward humans and animals) and the value systems of participants. The aims were to examine between-groups differences on: the relative importance of perceptions and beliefs concerning animal use, measures of empathy toward humans and animals, and which values are ranked as most and least important. Findings will demonstrate which factors best discriminate between groups holding different attitudes toward the use of animals for medical research, and the relative importance of values and empathy in relation to different people's views on animal use.

## **Summary**

This thesis aims to address why different people hold different views on the use of animals (i.e., between-subjects differences), and why individuals seem to have disparate views on animal use (i.e., within-subjects differences). In order to answer these questions, factors that underlie attitudes toward animal use are identified and then examined in order to develop our understanding of the basis and nature of attitudes toward this subject. Studies 1-3 explore psychological factors that underlie people's views, and therefore contribute to explanations about how people's views can vary (both between- and within- subjects). Study 4 manipulates one of these factors in order to determine a causal relationship between this and people's attitudes toward animal use. Studies 5 and 6 examine factors underlying the attitudes of different groups of people that are involved in animal use issues, and the relative strength of these are measured in order to determine which factors best distinguish between groups. Whilst previous research has focused on personal characteristics such as gender and personality in order to explain variance in attitudes, I propose that, whilst these are important, more significant are a person's perceptions and beliefs concerning animals and animal use. The present thesis provides evidence for this, comprising six studies that examine the psychological factors underlying people's attitudes that help explain both inter- and intra- individual and group differences.



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## **CHAPTER 2**

### **STUDY 1:**

#### **ATTITUDES TOWARDS ANIMAL USE AND BELIEF IN ANIMAL MIND<sup>1</sup>**

##### **AIMS:**

1. To compare attitudes towards different ways in which animals are used.
2. To examine the relative importance of belief in animal mind and personal characteristics, in relation to attitudes toward different types of animal use.

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<sup>1</sup> The present study has been published as it is presented here (Knight, S.E., Vrij, A., Cherryman, J., & Nunkoosing, K. (2004). Attitudes Towards Animal Use and Belief in Animal Mind. *Anthrozoos*, 17, 43-62). However, in Appendix I an extended method section is presented in order to provide additional detail for the reader.

**ABSTRACT**

Animals are used by humans in many ways, yet science has paid little attention to the study of human-animal relationships (Melson, 2002). In the present study participants (N= 96) completed a questionnaire on attitudes towards animal use and individual differences were examined to determine which characteristics might underlie these attitudes ('belief in animal mind', age, gender, experience of animals, vegetarianism, political stance, and living area). It emerged that participants held different views for different types of animal use, and that belief in animal mind (BAM) was a powerful and consistent predictor of these attitudes. BAM together with gender and vegetarianism predicted up to 37% of the variance in attitudes towards animal use. Thus future research should acknowledge the importance of BAM as a major underlying factor of attitudes towards animal use, and should also distinguish between different types of animal use when measuring attitudes. We proposed that the large effect of BAM might be due to increasing interest in animal mind over the past decade.

## INTRODUCTION

The term 'animal use' is used to describe a wide range of different practices that involve humans using animals. For example, for entertainment (e.g. circuses, fox hunting), for personal decoration (e.g. wearing animal fur, testing cosmetics on animals), for research (e.g. drugs testing on animals). Clearly there are differences between these uses in terms of what actually happens to animals, what the outcomes are, whether there are alternatives, and so on, yet much research has examined attitudes towards how animals are used in general (e.g. Armstrong & Hutchins, 1996; Matthews & Herzog, 1997), rather than looking at whether people hold different attitudes towards different ways in which animals can be used. Existing research also tends to use largely unrepresentative samples such as psychology students (Kafer, Lago, Wamboldt, & Harrington, 1992; Herzog & Dorr, 2000). The present study differs from previous studies in that (i) it compared attitudes towards *different types* of animal use, (ii) since 'belief in animal mind' (BAM) has been found to be a predictor of attitudes towards animal use (e.g., Hills, 1995), we tried to identify participant variables that might underlie BAM, and (iii) ours was a non-student sample.

### **Belief in animal mind (BAM)**

BAM is the term used for how we attribute to animals mental capacities such as intellect, the ability to reason, and feelings of emotion (see Hills, 1995), and has been defined and measured in a variety of ways (e.g. Herzog & Galvin, 1997; Hills, 1995), and thus is not a single, constant measure. That we try to understand ourselves and others by hypothesising about the reasons behind actions and interactions is central to social psychology (Smith & Mackie, 1995). Attribution Theory describes how people make sense of each other by attributing characteristics of that person (for example their behaviour) as influenced by external (e.g. the situation) or internal (e.g. personality) attributions (Heider, 1944; Kermel & Montgomery, 2001). Thus attitude formation of a person will be influenced

by the attributions associated with features of that person. Eddy, Gallup, and Povinelli (1993) suggested that BAM is a natural extension of Attribution Theory, in that BAM refers to internal attributions (such as mental states, characteristics and abilities) people believe animals to have. When people do not believe animals to be capable of thinking and feeling and so on, they are more inclined to support animal use (Herzog & Galvin, 1997).

### **Experience of animals**

Attitudes towards animal use are influenced by experience of animals (Wells & Hepper, 1997); for example, Driscoll (1992) found that pet owners rated animal research as less acceptable than did non-pet owners. Theoretical reasons for this relationship may relate to the 'contact hypothesis' (e.g., Allport, 1954), where contact with members of an outgroup (e.g. non-human animals) can lead to a mutual understanding and decreased prejudice towards that group. For example, inter-ethnic contact is a highly significant negative predictor of racial prejudice (Hamberger & Hewstone, 1997). Knowledge of an outgroup member through direct contact can lead people to share positive experiences and learn about positive characteristics of members of that outgroup, and as such will require the prejudiced person to question and cognitively re-construct their (often incorrect) negative perceptions of the outgroup members. Contact may also allow an emotional attachment to develop between a prejudiced person and an outgroup member, as the two get to know each other as people rather than as representatives of a group. Thus experience of animals could promote positive attitudes towards animals (e.g., by becoming emotionally attached to pets) and negative attitudes towards animal use (e.g., due to an increase in belief in animal mind). Experience of animals may also influence attitudes towards animal use issues in terms of personal relevance, since attitudes are influenced by the personal relevance of the issue in question (e.g. Petty & Cacioppo, 1990; Lieberman & Chaiken, 1996). So if experience of animals (such as

pet keeping) leads to people perceiving animal use issues to be more relevant to them personally, then attitudes towards such issues will be influenced by whether people have more or less experience of animals. This effect could influence attitudes either positively or negatively depending upon the type of experience with animals; a rewarding relationship with a pet could lead to less support for animal use, whereas a negative encounter with an animal may mean that people are more supportive of animal use.

## **Gender**

Males present lower levels of BAM compared to females (Herzog & Galvin, 1997), and the effects of gender on attitudes towards animal use are consistent. Males are considered to be generally more supportive of animal use (e.g., Furnham & Pinder, 1990; Rajecki, Rasmussen, & Craft, 1993; Plous 1996; Wells & Hepper, 1997), and such differences extend to at least fifteen countries (Pifer, Shimizu, & Pifer 1994). Indeed, gender differences concerning attitudes towards animals, animal use, and BAM, may have a biological basis in that there might be essential differences between male and female brain types (Baron-Cohen et al., 2002; Baron-Cohen, 2003). Influenced by hormonal and genetic differences, it has been suggested that more males are pre-disposed to spontaneously 'systemize' (and less likely to 'empathize', compared to the females) whilst more females are more likely to spontaneously 'empathize' and less likely to 'systemize' (Baron-Cohen, 2003). Systemizing describes the drive and ability to understand systems, rules and regularities, which involve non-agentive events (e.g. how an engine works, or profit and loss processes in business). That is, to consider the 'facts' as inputs to a 'relationship', and based on these facts predict the outcome of the relationship. In contrast, empathizing involves two major elements: (i) the ability to attribute mental states to oneself and to others; and (ii) the ability to respond in an emotionally appropriate way to that other's mental state (Baron-Cohen et al., 2002). In a sense this is similar to 'theory of mind' but goes further in

that it assumes some affective reaction (e.g. a sympathetic reaction to someone else's distress). Thus, it might be that females are less supportive of animal use because they are more likely to attribute mental states to animals, and more likely to have a sympathetic reaction to this if they believe that animal use will cause some kind of pain or distress to animals.

Others have examined sex role orientation (SRO) in relation to attitudes toward animal use (Herzog, Betchart, & Pittman, 1991; Peek, Dunham, & Dietz 1997), leading to mixed findings. Some suggest differences in attitudes as associated with feminine versus masculine SRO (Herzog, Betchart, & Pittman, 1991), whereas Peek, Dunham, and Dietz (1997) argued that sex differences differ not as a result of SRO, but that the structural location of females in society better explains gender differences (see Adams, 1994). That is, females identify with animals and animal rights issues because they perceive themselves and animals to have similar locations in society (i.e. beneath males) due to patriarchal oppression, and thus females tend to express more egalitarian and non-hierarchical ideologies. Herzog, Betchart, and Pittman (1991) proposed theoretical reasons for gender differences that included: (i) the sociocultural perspective, that women are socialised to care and nurture, whilst boys are encouraged to be less emotional and more utilitarian; (ii) biological reasoning that males see animals as a means to their survival, for example in terms of providing food, and also as a possible threat; (iii) the cognitive developmental view that males and females have different moral orientations that influence their perspective of animals (see Kellert & Berry, 1987); and (iv) that femininity leads to a more nurturance-expressive dimension of personality that is more highly related to concern for animal welfare, whilst masculinity relates to less sensitivity to the ethical treatment of other creatures. Further, Furnham and Pinder (1990) related gender differences to the work of Ekehammar (1985) who described gender differences on various ideological dimensions; females



present more liberal views whilst males are more conservative.

Differences between males and females in attitudes towards animal use may relate to these differences in ideological views, with females more likely to challenge societal norms whilst males may be more accepting of conventional practices such as animal use (Furnham & Pinder, 1990). Alternatively, females may have different moral orientations to males, basing judgements on caring whereas males tend to focus on justice (Gilligan, 1982). In all, an interplay between socialisation forces and structural forces are likely to underlie gender differences (Peek, Dunham, & Dietz, 1997), and sex differences are so large on almost all dimensions of attitudes toward animals that males and females probably have different emotional and cognitive orientations towards animals (Kellert & Berry, 1987).

### **Age**

Applegate (1973) found that older people were more supportive of deer hunting, whilst Kellert and Berry (1981) suggested that in general, younger people are more concerned about animal use than older people. More recent research (Driscoll, 1992; Furnham & Pinder, 1990) found that young people rated examples of animal research as less acceptable than did older groups of participants. Kellert and Berry (1987) described how older males presented a more utilitarian view towards animals, suggesting that the practical value of animals increases in relevance with age as work and familial responsibilities become more important. From an evolutionary perspective it may be that as people get older, their priorities change as children and family become top priority, whilst animals are perceived as comparatively less important and seen in more functional terms. Further, Baron-Cohen (2003) suggests that mental attribution becomes more complex with age, so it might be that there are age differences in BAM.

## **Eating meat**

Demand for particular types of food is influenced primarily by social psychological factors such as beliefs, attitudes norms and values (Kalof, Dietz, Stern, & Guagnano, 1999), and vegetarianism is related to value orientations such as an increase in altruistic values and a decrease in traditional values (Dietz, Frisch, Kalof, Stern, & Guagnano, 1995). Moreover, vegetarianism may relate to a wider ideological perspective in terms of the 'world view' held by people (Buss, Craik, & Dake, 1986; Furnham & Pinder 1990). Buss, Craik, and Dake (1986) identified two types of world view, one that values a high growth, high technology society, materialistic goals, and rational quantified decision-making processes, the other appreciating less material and technological growth, redistribution of wealth, goals of self-actualisation, and decision making determined by non-materialistic values (people holding the former view would be more likely to eat meat compared to those holding the latter view). Thus there may be ideological differences between vegetarians and non-vegetarians in terms of personal values and guiding principles that are extended to their views on other social issues such as feminism and wealth. Also, it may be that BAM is one reason why people abstain from eating animals and using animals in other ways. However, eating meat is a variable that in itself may be seen to represent an attitude towards animals. That is, for some reason animals should not be eaten. As such it is variable that differs in its nature compared to other participant characteristics such as age and gender.

## **Political stance and living area**

The media often portrays blood sports and animal management issues as a political argument or a town-versus-country debate (e.g., Barnett, 2000; Hunt, 2000; Day-Lewis, 2001). For example fox hunting has been presented as a sport supported by people with a more right-wing political stance, and people from more urban backgrounds have been portrayed as against hunting due to ignorance of country life. Research has shown that

people who are left-wing oriented are less supportive of using animals for medical research, which may reflect differences in peoples 'world view' (see Buss, Craik, & Dake, 1986), in that attitudes towards animals are closely related to attitudes towards other political and social matters (Furnham & Pinder, 1990). Further, people from more urban backgrounds present more positive attitudes toward animals (Kalof et al., 1999), whilst people from less industrialised, less urbanised countries may be more supportive of animal use (Pifer, Shimizu, & Pifer, 1994).

### **Attitudes toward different types of animal use**

Previous research has studied attitudes towards animal use as a uni-dimensional factor (e.g., Armstrong & Hutchins, 1996; Matthews & Herzog, 1997). However, people can hold different attitudes towards different ways in which animals are used, for example people may be less supportive of uses that lead to death of animals (such as medical research) compared to non-lethal uses (such as for entertainment) (Wells & Hepper, 1997). Consequently, in the present study, levels of support for six different types of animal use were compared. Four of these were identified as themes that consistently emerge as important from animal rights literature (Armstrong & Hutchins, 1996): (i) 'using animals for medical research'; (ii) 'using animals in the classroom'; (iii) 'using animals for personal decoration'; and (iv) 'animal management' issues. Two other categories were included based on our own ideas and other previous research (Matthews & Herzog, 1997): (v) 'using animals for entertainment', and (vi) 'using animals for financial gain'.

### **The present study**

A questionnaire (see Appendix II) was developed that measured attitudes toward animal use and BAM. Based on previous findings, it was predicted that there would be significant differences between different types of animal use (Hypothesis 1), that females would be less supportive of animal use compared to males (Hypothesis 2), as would participants with

more experience of animals compared to those with less experience (Hypothesis 3), and participants with higher levels of BAM compared to those with lower levels (Hypothesis 4). Also, that older participants would be more supportive of animal use (Hypothesis 5), as would non-vegetarians compared to vegetarians (Hypothesis 6), participants who rated themselves as more right-wing compared to those who were more left-wing (Hypothesis 7), and those who grew up in more rural areas compared to those from more urban areas (Hypothesis 8). Finally, we predicted that females would present higher levels of BAM compared to males (Hypothesis 9).

## **METHOD**

### **Participants**

A convenience sample of 96 participants took part (41 males, 55 females), with an average age of 39.32 years ( $SD = 13.90$ ). Of these, 65.6% were pet-owners at present, 88.5% were meat-eaters, 13.5% responded that their political stance was 'left-wing' or 'somewhat left-wing', 28.1% 'somewhat' or 'very right-wing', 58.3% were 'neutral' (none responded that they were 'very right-wing' or 'very left-wing'). In terms of where they grew up 36.4% responded 'very rural' or 'somewhat rural', 35.4% 'somewhat urban' or 'very urban', and 28.2% responded to the 'neutral' option.

### **Design**

A questionnaire design was used for this study (see Appendix III for all statements, their sources, and categories), to measure attitudes towards 6 different types of animal use and BAM. Statements were responded to using a 7-point Likert scale (from strongly agree to strongly disagree).

### **Procedure**

A convenience sample of people in public places (i.e. the local shopping precinct and ferry terminals) in the Portsmouth (United Kingdom) area

were asked to complete the questionnaire. Approximately half of those approached chose not to participate. The experimenter aimed for a fairly equal distribution of gender, and a wide age-range (with a minimum age of 18 years, in order to avoid problems with informed consent). Completing the questionnaire took between 10-20 minutes.

### **Coding**

Statements were coded so that higher scores represented more support for animal use and higher levels of BAM.

### **Examining the reliability of the questionnaire**

To test for reliability, Cronbach's alpha was calculated to measure the internal consistency of each category. Internal consistency was high for all of the animal use categories: medical research (Cronbach's alpha = .88), classroom use (Cronbach's alpha = .74), personal decoration (Cronbach's alpha = .85), entertainment (Cronbach's alpha = .70), animal management (Cronbach's alpha = .77), and financial gain (Cronbach's alpha = .67), whilst reliability for BAM was lower (Cronbach's alpha = .62).

### **Correlations between animal use categories**

To examine whether there was a relationship between attitudes towards the different types of animal use, Pearson's correlations were conducted (see Table 2.1). High correlations between all categories indicated strong relationships between attitudes towards different ways in which animals are used<sup>1</sup>.

Table 2.1. Correlations between specific forms of animal use

	Medical research	Classroom	Personal decoration	Entertainment	Management	Financial gain
Medical research						
Classroom	.70**					
Personal	.63**	.52**				
decoration						
Entertainment	.50**	.56**	.68**			
Management	.63**	.58**	.60**	.63**		
Financial	.66**	.50**	.65**	.61**	.56**	
gain						

\*\* represents  $p < 0.01$  level (2-tailed).

RESULTS

Attitudinal responses to the eight categories of statements

Mean scores for each category are shown in Table 2.2 (higher scores represent more support for animal use and higher levels of BAM, and subscripts indicate where differences lie). A repeated measures ANOVA revealed significant differences between some of these six different types of animal use categories ( $F(5, 475) = 88.40, p < .001$ )

**Table 2.2. Mean scores representing specific forms of animal use**

Category	Mean score	SD
Medical research	3.65 <sub>a</sub>	1.61
Classroom use	3.64 <sub>a</sub>	1.21
Personal decoration	2.09 <sub>c</sub>	1.21
Entertainment	2.19 <sub>c</sub>	1.05
Animal management	3.07 <sub>b</sub>	1.16
Financial gain	2.10 <sub>c</sub>	.90
Animal mind	5.77	.96

Note: Only means with a different subscript differ significantly from each other

Participants were significantly more supportive of using animals for medical research and in the classroom than for other types of animal use. Scores for animal management issues were significantly lower than those for medical research and classroom issues but significantly higher than scores for personal decoration, entertainment and financial gain. Least support was shown for the latter three categories (which were significantly lower than all other scores but not significantly different from each other) (therefore Hypothesis 1 was accepted).

### **Participant variables, attitudes towards animal use and BAM**

Correlations and standard regression analyses were conducted to examine the predictive value of participant variables and BAM on scores for different types of animal use (see Table 2.3).

**Table 2.3. Relationships between belief in animal mind (BAM), participant variables, and attitudes towards animal use**

		Medical research	Classroom	Personal decoration	Entertainment	Management	Financial gain
BAM <sub>a</sub>	r	-.46**	-.46**	-.53**	-.51**	-.52**	-.52**
Regression	B	-.41	-.45	-.50	-.49	-.54	-.49
	t	-5.31**	-5.02**	-6.07**	-5.91**	-6.84**	-5.94**
Age <sub>a</sub>	r	.03	.10	.09	-.03	.17	.04
Regression	B	-	-	-	-	.22	-
	t	-	-	-	-	2.75**	-
Gender <sub>b</sub>	r	.34**	.16	.22	.36**	.37**	.26**
Regression	B	-.20	-	-.18	-.30	-.26	-.20
	t	-2.51**	-	-2.14	-3.60**	-3.25**	-2.42*
Pet <sub>b</sub>	r	-.10	.01	-.09	-.17	-.07	-.06
Regression	B	-	-	-	-	-	-
	t	-	-	-	-	-	-
Meat <sub>b</sub>	r	.39**	.23*	.30**	.22*	.30**	.33**
Regression	B	-.39	-.23	-.20	-	-.20	-.23
	t	-4.86**	-2.59*	2.43*	-	-2.56*	-2.71**
Politics <sub>a</sub>	r	.12	.13	.08	-.06	-.02	-.02
Regression	B	-	-	-	-	-	-
	t	-	-	-	-	-	-
Area <sub>a</sub>	r	-.22*	-.03	-.15	-.06	-.05	-.13
Regression	B	.23	-	-	-	-	-
	t	2.92**	-	-	-	-	-
	r <sub>2</sub>	.46*	.27*	.37**	.35**	.47**	.38**
	F	19.80	16.94	17.77	25.05	20.21	18.58
	d f	4, 91	2, 93	3, 92	2, 93	4, 91	3, 92

a Pearson correlation conducted

b Spearmans correlation conducted

\* = Significant at the 0.05 level (1-tailed), \*\* = Significant at the 0.01 level (1-tailed).



### **Correlations between participant variables and attitudes towards animal use**

First, lower levels of BAM, being male, eating meat, and living in more urban areas were related to higher levels of support for medical research (providing support for Hypotheses 2, 4, 6 and 8). Second, lower levels of BAM, being male, and eating meat, were associated with more support for using animals for personal decoration, for entertainment, for financial gain, and animal management issues (providing support for Hypotheses 2, 4 and 6). Third, lower levels of BAM and eating meat were related to higher levels of support for using animals in the classroom (providing support for Hypotheses 4 and 6).

### **Participant variables as predictors of attitudes towards animal use**

As recommended by Field (2000), in order to establish which variables were important predictors (BAM, gender, eating meat, experience of animals, political stance and living area) of attitudes towards the six different types of animal use, standard regression analyses were conducted. Next, regression analyses were repeated, but this time excluding those predictors that were revealed as non-significant in the original analyses, with the forward stepwise technique used to clarify which predictors were most important (only these latter findings are discussed).

For attitudes towards *using animals for medical research*, BAM, gender, eating meat, and living area accounted for 46.5% of the variance. Females were less supportive ( $M = 3.18$ ,  $SD = 1.50$ ) compared to males ( $M = 4.27$ ,  $SD = 1.58$ ), as were those who did not eat meat ( $M = 1.82$ ,  $SD = 1.01$ ) compared to those who did ( $M = 3.88$ ,  $SD = 1.53$ ), and those from more urban backgrounds compared to those from more rural backgrounds (supporting Hypotheses 2, 4, and 6, but contradicting Hypothesis 8).

BAM and eating meat accounted for 30% of the variance in attitudes towards *using animals in the classroom*. Those who did not eat meat were less supportive of using animals in the classroom ( $\underline{M} = 2.76$ ,  $\underline{SD} = 1.16$ ) compared to those who did ( $\underline{M} = 3.75$ ,  $\underline{SD} = 1.17$ ) (supporting Hypotheses 4 and 6).

BAM and eating meat were again significant predictors of attitudes towards *using animals for personal decoration*, accounting for 37.7% of the variance. Participants who did not eat meat ( $\underline{M} = 1.18$ ,  $\underline{SD} = 1.21$ ) compared those who did ( $\underline{M} = 2.21$ ,  $\underline{SD} = 1.23$ ) were less supportive of using animals for personal decoration (supporting Hypotheses 4 and 6).

For attitudes towards *using animals for entertainment*, BAM and gender accounted for 35% of the variance. Females were less supportive of using animals for entertainment ( $\underline{M} = 1.90$ ,  $\underline{SD} = .93$ ), compared to males ( $\underline{M} = 2.58$ ,  $\underline{SD} = 1.07$ ) (supporting Hypotheses 2 and 4).

BAM, age, gender and eating meat were significant predictors of attitudes towards *animal management*, accounting for 47% of the variance. Age increased as support decreased, females showed less support for animal management ( $\underline{M} = 2.71$ ,  $\underline{SD} = 1.61$ ) than males ( $\underline{M} = 3.56$ ,  $\underline{SD} = 1.17$ ), as did those who did not eat meat ( $\underline{M} = 2.11$ ,  $\underline{SD} = .90$ ) compared to those who did ( $\underline{M} = 3.20$ ,  $\underline{SD} = 1.13$ ) (supporting Hypotheses 2, 4, 5 and 6).

Finally, BAM, gender and eating meat accounted for 37.6% of the variance in scores for *using animals for financial gain*. Again, females were less likely to support financial gain as a justification for using animals ( $\underline{M} = 1.90$ ,  $\underline{SD} = .78$ ) compared to males ( $\underline{M} = 2.38$ ,  $\underline{SD} = .94$ ), as were those who did not eat meat ( $\underline{M} = 1.38$ ,  $\underline{SD} = .47$ ) compared to those who did ( $\underline{M} = 2.20$ ,  $\underline{SD} = .88$ ) (providing further support for Hypotheses 2, 4 and 6).

### Participant variables and BAM

Correlations examining relationships between participant variables and BAM found only one significant positive correlation that was between BAM and age. Furthermore, age emerged as the only significant predictor of BAM when regression analysis was conducted, accounting alone for 9% of the variance in scores (see Table 2.4) (therefore Hypothesis 9 was not supported).

**Table 2.4. Relationships between participant variables and BAM**

		Belief in animal mind
Age <sub>a</sub>	r	.28*
Regression	B	.29
	t	2.63**
Gender <sub>b</sub>	r	.05
Regression	B	-
	t	-
Pet <sub>b</sub>	r	-.13
Regression	B	-
	t	-
Meat <sub>b</sub>	r	.08
Regression	B	-
	t	-
Politics <sub>a</sub>	r	-.03
Regression	B	-
	t	-
Area <sub>a</sub>	r	-.05
Regression	B	-
	t	-
$r^2$		.05
F		5.35
df		1, 94

a Pearson correlation conducted

b Spearmans correlation conducted

\* = Significant at the 0.05 level (1-tailed), \*\* = Significant at the 0.01 level (1-tailed).

## DISCUSSION

Whilst previous research in this area has tended to use unrepresentative samples, this study used a non-student sample to examine attitudes towards animal use and Belief in Animal Mind (BAM). It was found that participants had significantly different attitudes towards different types of animal use, and belief in animal mind (BAM), gender and eating meat were related to attitudes towards animal use, with BAM clearly the most powerful and consistent predictor of attitudes towards all types of animal use. Higher levels of BAM were related to less support for animal use (as was being female and not eating meat). Age had a small but significant effect on BAM, with older participants presenting higher levels of BAM. Little evidence was found for relationships between attitudes and beliefs and the other participant variables examined.

Previous studies have found variables such as gender and age to account for only a small (although significant) amount of variance in attitudes toward animal use (Driscoll, 1992). This study however found BAM to be a much stronger predictor of attitudes. This may relate to an increase in BAM in the past decade, for example due to publicized research and television programmes people may be generally more knowledgeable about animal cognition (H.A. Herzog, personal communication, November, 2002), and thus BAM may have increased in its impact on attitudes toward animal use. If this is the case then BAM may go a long way in helping us to understand people's attitudes towards the treatment of animals compared to other variables such as gender and age. It seems likely that one reason for the relationship between BAM and attitudes towards animal use is that lower levels of BAM mean that people consider animals more as mechanical objects than thinking, feeling creatures, and thus support animal use since the animals involved cannot be mentally harmed by such use. Higher levels of BAM introduce a moral dilemma to people, since they have to decide whether pain and/or distress inflicted on the animal (that

they believe the animal is capable of experiencing) can be justified. However, this does not explain why BAM does not seem to be related to eating meat, and it might be that BAM is only a correlate of attitudes towards animal use and there is a higher-order factor that we have yet to identify. Future research needs to recognise the large impact of this factor compared to other participant variables, whilst examining this relationship in more depth. Also, this study did not find a causal relationship between BAM and attitudes, and thus experimental designs that involve the manipulation of BAM will enhance our understanding of this relationship further (see Opatow, 1993, for a method that might be used).

### **Explaining different attitudes towards different types of animal use**

Since the effects of BAM, gender and eating meat rarely differed according to type of animal use in question, and high correlations between categories of animal use were found, suggests that there may not be a clear distinction between these categories. However, analysing the data separately for each category made sense because we wanted to see if people had different views on different ways in which animals are used, and significant differences found between categories showed that this is the case.

### ***Gender differences***

Consistent with previous research, females were found to be significantly less supportive of animal use. However, the mean scores for each category across gender showed that men's ratings were around or below the middle of the Likert scale, indicating that male support for animal use was also limited. Thus gender may be less important in relation to attitudes towards animal use than first imagined. Indeed, whilst gender and SRO are consistent factors in relation to attitudes towards animal use, they account for only a small amount of the variance (e.g. Herzog, Betchart, & Pittman, 1991; Driscoll, 1992).

***Eating meat***

Eating meat had a similar relationship to that of gender on attitudes- that is, whilst meat eaters were more supportive of animal uses, again mean scores for meat-eaters were all below the middle of the scale. This suggests that the meat eaters were not generally supportive of animal use. No significant differences were found between those participants who did and did not eat meat for levels of BAM, suggesting that higher levels of BAM do not lead to not eating meat (nor vice versa).

***Age***

Little support was found for relationships between attitudes and age, although younger participants were significantly less supportive of animal management issues. All statements in this category described animal use that involved wild animals (e.g. birds and mice) in their natural environment, and so it may be that younger people have different views towards wild animals in their natural environment compared to, for example, domesticated or farm animals. Indeed, Kellert and Berry (1981) discussed how younger people preferred animal life and the outdoor environment, so perhaps there is only a relationship between age and attitudes towards animal use when wild animals are concerned. This may be because younger people are more likely to take part in outdoor activities, or because they are a cohort that have been educated to be more aware of environmental issues such as conservation due to rising concerns in the past decade over pollution, the ozone layer, and so on. The younger cohort may also have had more exposure to animal welfare issues and procedures, and egalitarian views towards politics and animal rights. Further work is needed to investigate the effects of age on attitudes towards animal use.

***Experience of animals***

Although previous findings have reported a strong relationship between pet ownership and attitudes towards animal use (Paul & Serpell, 1993),

this was not the case in the present study. However, since others suggest that this factor accounts for only a small amount of variability in attitudes (Driscoll, 1992), it may be that whilst pet ownership might influence attitudes towards animals (or vice versa), the relationship may not be a strong one. Alternatively, Paul and Serpell (1993) recommended that experience of animals be measured in terms of the *quality* of experience rather than experience per se, and the 'contact hypothesis' suggests that it is *intimate* relationships (e.g. friendships) that are influential in changing inter-group attitudes ( Hamberger & Hewstone, 1997). This study used pet ownership as a measure of experience of animals, rather than pets perceived to be important. Thus studies in the future might need to use more refined ways to measure experience of animals. One final point is that the relatively small sample size used in this study may have led to Type 2 errors, and thus a relationship that does exist may not be evident. Again, future research is needed to clarify this issue.

### ***Political stance and living area***

No evidence was found for a relationship between political stance, living area, and attitudes towards using animals. Thus it seems that attitudes towards animal use are not political nor are they influenced by living area, despite journalists indicating this to be the case. Alternatively, again a Type 2 error due to the relatively small sample size may have obscured a relationship between these variables and so further investigation in this area is necessary.

### **Participant characteristics and BAM**

Age was the only predictor of BAM (with BAM increasing with age), although there was no relationship between age and attitudes towards animal use. Thus it seems that low levels of support shown by younger people may be due to reasons other than BAM (such as an increase in education relating to environmental issues or more egalitarian perspectives on life), whilst older people may be less supportive of animal

use due to higher levels of BAM. Baron-Cohen (2003) suggested that mental attribution becomes more complex with age, yet differences between male and female brains (in empathizing and systemizing) can be observed and studied from one year of age (Baron-Cohen, Tager-Flusberg, & Cohen, 1994). Future research might explore (i) gender differences in children relating to BAM and attitudes towards animal use from Baron-Cohen's perspective, and (ii) how age, attitudes towards animal use, and BAM might be inter-related.

### **Different attitudes and BAM for different species of animals**

This study measured BAM and attitudes towards animal use of animals in general, with only several of the statements referring to particular species of animals. This may have confounded results if participants have different views on BAM and animal use depending upon the species of animal involved. Thus future research may specify particular types of animals when examining such views and beliefs, since the term 'animal' may be too broad when measuring such attitudes. Another problem with the questionnaire used in this study is that the reliability of the BAM subscale was relatively low (although acceptable), thus indicating that future research might need a better measure for this variable (see Herzog & Galvin, 1997, for an alternative measuring tool).

### **Socio-psychological factors and attitudes towards animal use**

Future research should also consider socio-psychological factors (such as moral orientation and ethical ideology) that underlie attitudes toward the treatment of animals. For example, Galvin and Herzog (1992) found that animal rights activists held 'absolutist' moral orientation, that is they believed that there are universal moral principles that should be adhered to, and that adherence would lead to positive consequences. Furthermore, the idea that people hold a 'world view' (Buss, Craik, & Dake, 1986) suggests that attitudes towards animals and the environment are closely inter-related with attitudes towards other social and political issues



(Furnham & Pinder, 1990; Pifer, Shimizu, & Pifer, 1994). In addition to such orientation, a person's position in society may be related to attitudes, for example females and Blacks may have had similar experiences of subordination may therefore empathise more with the treatment of animals (Kalof et al., 1999). Thus structural location and ethical idealism may relate to empathy that is extended to other living creatures (Galvin & Herzog, 1992).

## **Conclusions**

Findings from the present study show BAM to be a strong and consistent predictor of different types of animal use. If BAM has increased in recent times due to publicity relating to animal cognition then this would explain why this factor seems to have such a crucial impact on attitudes toward the treatment of animals. Moreover, our results showed that attitudes do differ depending on the different types of animal use in question, and we suggest that future research should investigate attitudes towards animal use accordingly. The present study used a non-student sample so it is hoped that findings are more representative than those of past research that used students only as participants. Although there are disadvantages with using convenience samples (e.g. a high refusal rate can skew findings), we are optimistic that findings from this study may enhance understanding of attitudes toward how animals are used in our society.

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#### ENDNOTES

<sup>i</sup> On the basis of high correlations between categories, factor analysis was conducted to ensure that the questionnaire was not assessing one common construct. This analysis revealed five distinct factors, i.e. factors consisting of 3 or more items (items interpreted as members of a factor if they had a loading of > .40 on one factor only). Unfortunately, only two of the original six categories emerged (one factor consisted of three out of the original four items from the 'financial gain' category, and a second factor consisted of four out of the original five items from the 'personal decoration' category). The remaining three factors did not reflect any of the factors initially predicted. However, since the factors that emerged from the factor analysis were difficult to interpret

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theoretically, it was decided that analysis would continue to examine data for the original six categories.

## **CHAPTER 3**

### **STUDY 2: ATTITUDES TOWARD ANIMAL USE: A GROUNDED THEORY APPROACH<sup>1</sup>**

#### **AIMS:**

1. To examine why people have different attitudes toward different ways in which animals are used.
2. To identify what other psychological factors might be important in relation to views on animal use.
3. To explore belief in animal mind in more depth.

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<sup>1</sup> The present study has been published as it is presented here (Knight, S.E., Nunkoosing, K. Vrij, A., & Cherryman, J. (2003). Why do people have different attitudes towards different types of animal use?: A Grounded Theory approach. *Society & Animals*, 11, 307-327). However, in Appendix IV an extended method section is presented in order to provide additional detail for the reader.

**ABSTRACT**

This study uses qualitative methodology to examine why people have different attitudes toward different types of nonhuman animal use. Seventeen participants took part in semi-structured interviews. Grounded Theory Methodology was used to collect data and analyze the interviews, and a model was developed that consists of 4 major themes: (a) "attitudes toward animals," (b) "knowledge of animal use procedures," (c) "perceptions of choice," and (d) "cost-benefit analysis." The findings illustrate that cognitive processing, characteristics of the species of animal being used, and the type of animal use can all influence attitudes toward animal use. Because previous research has focused on participant variables such as age and gender to explain variance in attitudes toward animal use (Furnham & Pinder, 1990; Kellert & Berry, 1981) and measured attitudes toward animal use in general (rather than distinguishing between different types of use) (Armstrong & Hutchins, 1996). These findings can add to knowledge of people's views on animal use; this paper discusses how such views may be justified and maintained.



## **INTRODUCTION**

The present study used in-depth interviews that allowed participants to explore their views with greater freedom than is possible in questionnaire studies, in order to address why people have different views toward different types of nonhuman animal use. "Animal use" refers to a range of practices that involve humans using nonhuman animals, such as cosmetics testing on animals, hunting animals for sport and farming. Yet, while people often hold different views toward different types of animal use (Knight, Vrij, Cherryman, & Nunkoosing, 2004; Plous, 1993), research has continued to measure attitudes toward animal use in general (Armstrong & Hutchins, 1996; Matthews & Herzog, 1997). That is, attitudes have been discussed as a uni-dimensional construct rather than distinguishing between attitudes toward different types of animal use. Furthermore, while most studies have focused on participant characteristics (gender and age) to explain variations in attitudes (Furnham & Pinder, 1990; Kellert & Berry, 1981), we argue that factors relating to the species of animal and type of animal use also might influence people's views on this subject. For although people often may express generalized attitudes about whole classes of things, people, places, and events, they also modify these attitudes (and their accompanying behaviour), according to specific contexts as demonstrated in the classic LaPiere (1934) study. Thus, animal use is not a unitary concept because it relates to many different aspects of human lives and their relationships with animals. For example, a vegetarian with diabetes may still rely on insulin made from animal sources.

### **Belief in Animal Mind**

People hold different attitudes toward animal use depending on the species of animal to be used (Driscoll, 1992; Herzog & Galvin, 1997). The basis of this discrimination often depends on where the animal in question was perceived to be situated on the phylogenetic scale, based on beliefs concerning the animals' perceived mental abilities. "Belief in animal mind"

(BAM) is the term used to describe people's belief in the mental abilities of animals, such as their capacity for self-awareness, to solve problems, experience emotions, and so on. BAM is a consistent predictor of attitudes to animal use (Hills, 1995; Knight, et al., 2004). BAM negatively correlates with support for animal use while positively correlating with concern for animal welfare and humane behaviour toward animals (Broida, Tingley, Kimball, & Miele, 1993), and empathy toward other humans and animals (Hills, 1995).

### **Why Use Qualitative Methodology?**

People often do not have great insight into their attitudes and beliefs concerning animal use (Pifer, Shimizu, & Pifer, 1994); thus, it is important that research methods encourage participants to think about, and verbalize, their views (Hills, personal communication, January, 2002). Also, quantitative methodology examines only constructs generated by the researcher. Thus, data and understanding is constrained to such pre-conceived constructs, whereas qualitative methods encourage participants to introduce the factors that they perceive to be important and relevant, allowing new constructs to emerge that are not constrained by the researcher. The present study uses qualitative methodology, not as an antithesis or alternative to quantitative methods, but to complement quantitative research (Bauer, Gaskell, & Allum, 2002).

Herzog (1993) proposed that qualitative methodology can enable us to understand the psychology behind the complexities of human-animal relationships, and such methods can enable researchers to create or develop new theories in areas of research where there is little existing knowledge (Rennie, Phillips, & Quartaro, 1988). Thus, the contemporary version of Grounded Theory (Strauss & Corbin, 1991) was used to develop a model that explains why people have different attitudes toward different types of animal use.

## **METHOD AND ANALYSIS**

### **Participants**

Nine men and eight women, aged 22-65 years, took part in semi-structured, individual interviews. The 17 participants represented the number of participants needed to reach theoretical saturation. This refers to the stage of data collection when new issues and ideas cease to emerge.

### **Interviews**

Each in-depth interview followed a flexible format that allowed all persons to explore fully their ideas about animal use and their relationships with animals. The first author interviewed all participants. Each interview started by asking whether the participant held different attitudes toward different types of animal use and, if so, why this was the case. In keeping with the principles of theoretical sampling (Strauss & Corbin, 1991), new issues were included in the interview protocol as they arose, to be used in subsequent interviews. These included topics such as farming, knowledge of animal use, whether participants considered there to be alternatives to using animals, the perceived costs and benefits of animal use, physical characteristics of animals, and attitudes and beliefs concerning birds, fish, and farm animals. Participants were encouraged to lead the interview and discuss issues that they perceived as important and relevant. Each interview took between 45-90 minutes.

### **Preparation for Analysis**

All interviews were transcribed verbatim, with double spacing and wide margins for notes during coding, that resulted in 274 pages of transcripts. Each participant was given a number code, and each line of the text was numbered to facilitate location and indexing when necessary (Nunkoosing & Phillips, 1999).

## **Overview of Analysis Techniques**

The Grounded Theory method of constant comparative analysis was employed to analyze the transcripts (Glaser & Strauss, 1967; Strauss & Corbin, 1990; Turner, 1981). Each transcript was read several times; then each word, line, and paragraph was examined to code text into smaller chunks ("open coding"). Each chunk was examined with the question, "what does this represent?" in mind, and each incident was compared with those before and after it. When all the text had been "chunked" and allocated descriptive codes, the codes were grouped into categories; similarities, differences, relationships, and patterns were noted as they emerged. This required the reading and re-reading of transcripts, and memos of issues and ideas that emerged throughout the process were recorded. Such memos kept in the form of a manuscript, together with notes in the margins of the transcripts, provided the basis of the write-up of results. A "paper trail" from data collection to analysis was kept.

The process of interpretation by the researchers was guided by asking questions such as what does this represent; why is this a representation of the event/concept/idea and no other; and how else does this participant represent this idea. Thus, interpretation is a loose, two-part process. First, coding, noting, and categorizing data may be seen as constituting the analysis part of the process that relies on the researcher's skill at identifying those aspects that potentially might represent a participant's theory about the topic of this study. The second part of interpretation seeks to demonstrate understanding of the world from the perspective and position of the participant. That is, the text was deconstructed and then reconstructed.

RESULTS AND DISCUSSION

Overview of Findings

This research aimed to develop a theory of why people present different attitudes toward different types of animal use. It was found that attitudes varied and were mediated by a combination of factors: (a) attitudes toward animals, (b) knowledge of animal use procedures, (c) whether the perceived benefits of using animals outweighed the perceived costs, and (d) whether there was a choice other than using animals (see Table 3.1).

Table 3.1. Themes that explain attitudes toward different types of animal use

Themes	Properties
1 ATTITUDES TOWARD ANIMALS	Knowledge of animals (BAM and physical characteristics)
2 KNOWLEDGE OF ANIMAL USE PROCEDURES	Knowing about animal use Knowing about alternatives Not wanting to know
3 COST-BENEFIT ANALYSIS	Animal use for human health benefits Animal use for animal health benefits Animal use as a moral issue
4 PERCEPTIONS OF CHOICE	Is animal use necessary? How are animals treated? Is animal use natural?

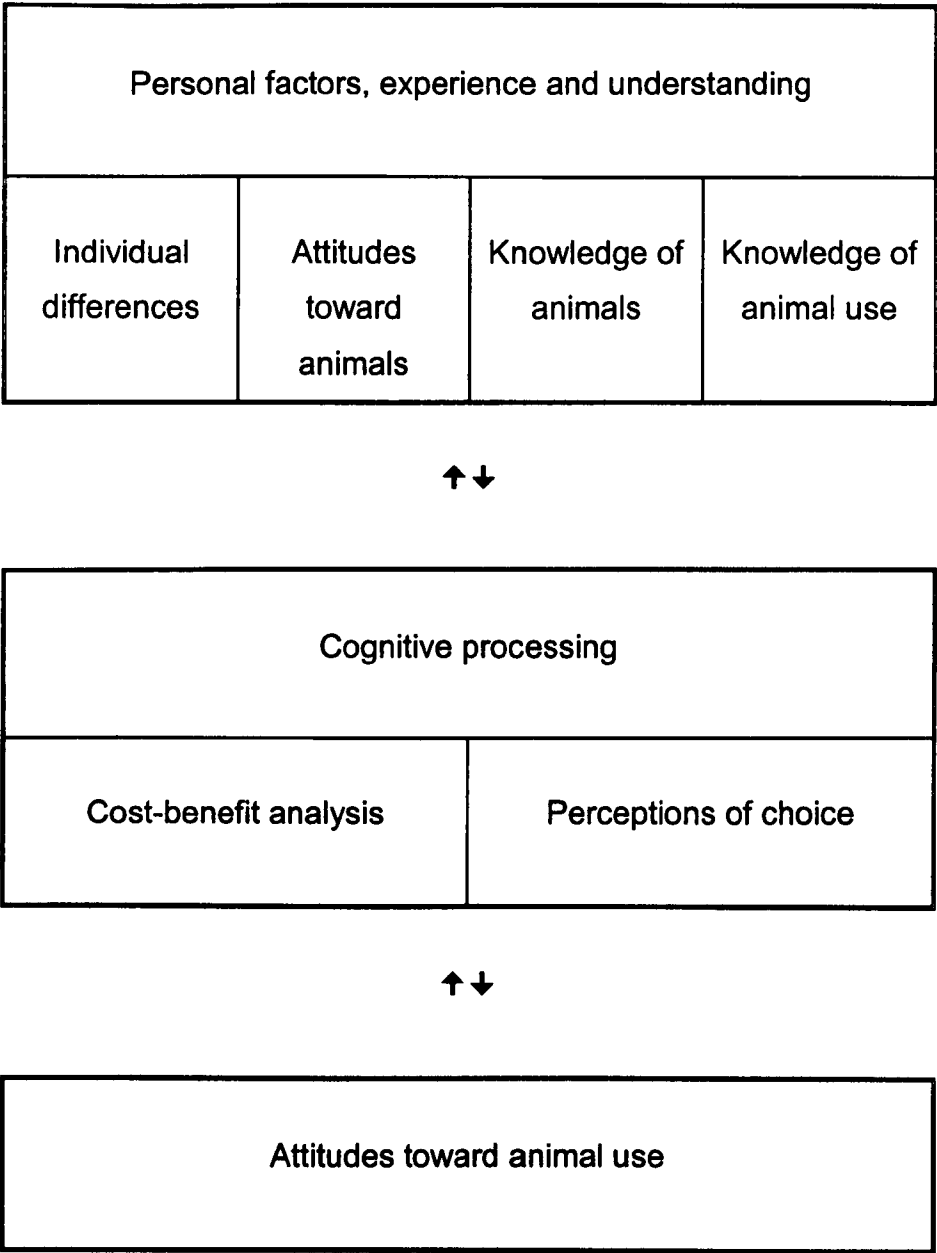
Summarizing the results, participants in the present study showed least support for using animals for entertainment and for personal decoration and most support for medical research and in teaching (dissection). This reflected our earlier findings (Knight, et al., 2004). Animal use was most likely to be supported when participants perceived there to be no choice

other than using animals, when little was known about animal use procedures, when liking for animals was low, and when the benefits of using animals were perceived to outweigh the costs.

Support for entertainment and personal decoration was low, as these uses were seen as unnecessary. That is, participants believed that there is no need to use animals for entertainment and that there are alternatives to using animals for personal decoration (e.g., cruelty-free cosmetics and fake fur). Participants believed that humans have a choice in terms of using animals for entertainment and personal decoration; these uses were perceived to be frivolous and unnecessary. However, when it came to discussing using animals in research and in teaching, participants thought the benefits of these to be so great that using animals was our only choice.

Moreover, participants could seldom think of replacements for animals in research and in teaching and so again believed that there was little choice other than using animals. Knowledge of animal use procedures also influenced attitudes, with more knowledge leading to reduced support for animal use. Furthermore, the benefits of using animals for research and teaching often were perceived to far outweigh the costs, although this was seldom the case for more “trivial” uses such as entertainment and personal decoration. Figure 3.1 presents a model that brings together the themes that emerged from this study, representing how people theorize about their views on animal use.

Figure 3.1. Attitudes Toward Animal Use: A Model



The model illustrates that when people are thinking about their views on animal use, personal factors that can vary between people (such as what people know about animals and animal use) influence cognitive processing (in terms of cost-benefit analysis and perceptions of choice). Different personal factors and the varying impact of these may help to explain why different people hold different views toward different types of

animal use. If a person (a) believes that animals are capable of experiencing pain and suffering (“knowledge of animals”), (b) believes that there are alternatives to using animals in research (“knowledge of animal use”), and (c) has a positive attitude toward animals (“attitudes toward animals”), then these factors will influence cognitive processing (both “cost-benefit analysis” and “perceptions of choice”), and that person will be less supportive of using animals for research.

It is important to note that this model (Figure 3.1) is fluid. Thus, rather than people considering the “facts” and then forming an attitude based on these factors, it seems that people often work backward. Although they like animals, they also eat meat and, therefore, need to justify this contradictory behaviour. Thus, they “build” their argument to justify their existing view or behaviour, rather than forming an attitude based on the arguments. Therefore, information is actively sought after, or actively avoided, depending on whether it supports or undermines the existing attitude or behaviour. This is of psychological importance. Future research using quantitative methods may now test this model in terms of examining the direction and strength of relationships between themes, how much impact each of these factors has on attitudes toward animal use, and which are most influential. Knowledge of this may give some indication of how attitudes may be changed and thus may be useful to scientists seeking support for their work or animal welfare workers trying to increase support for the humane treatment of animals.

Each theme now is described in detail, and excerpts from the transcripts are used throughout to enhance understanding and to demonstrate that the developing theory remained grounded in the data. Each quotation is followed by information that can enable the excerpt to be traced (P followed by a number represents participant number, L followed by numbers represent line number in text).



## **Attitudes Toward Animals**

How participants feel about animals was clearly central to how they felt about animal use, in that the more participants liked animals, the less they supported animal use (and vice versa).

'...so, um, it [animal use] is a classic moral dilemma if you like animals and don't want them to suffer.' (P1, L79-80)

Underlying attitudes toward animals was a perceived knowledge of animals, in terms of belief in animal mind (BAM), and physical characteristics of animals.

## **Belief in Animal Mind (BAM)**

All participants discussed the mental abilities of animals, and none seemed to doubt the existence of animal mind.

'I find it very hard to believe that a complex, living, breathing, animal of any sort -- human or otherwise -- can't think and feel, it seems a bit strange to me.' (P9, L294-296)

However, while participants clearly believed in animal mind, they also discussed how as humans we cannot know what goes on in these minds. Thus, animal minds are considered somehow different from human minds.

'I don't know any more than that because none of us know what goes on in the minds of animals.' (P5, L108-109)

Moreover, not only were animal minds perceived to be different from that of humans, all participants expressed the belief that animal mind is different for different species of animals. For example, they believed that although virtually all animals are capable of some kind of basic mental activity, belief in "higher" mental functions was reserved for only particular species of animals such as chimpanzees and apes.

'I mean I would draw the distinction between different sort of animals- I think a great many animals would feel pain, but only a relatively small number of species would have the ability, I suspect, to reason

and think things through, and operate as social animals, but some certainly can.' (P5, L110-114)

There was a clear relationship between BAM and attitudes toward animal use, in that animal use was perceived as more acceptable when animals were believed to be lacking in mental ability. This allowed participants somehow to avoid personal conflict between, on one hand, their affection for animals and, on the other, their support for animal use.

'I think it serves a purpose for us to believe animals don't think and feel....Because that creates so many other issues about the way we treat them, for food or whatever.' (P7, L307-310)

'I think it's that [instinct] that guides animals rather than intelligence. I don't believe it's true intelligence- I hope it's not- I wouldn't like that [pheasant shooting] if it was.' (P5, L195-197)

Indeed, two participants involved in hunting said that they would not hunt certain animals if they believed they were mentally capable.

'I don't think they [foxes] do [have intelligence], but if I did I think that would put me off [hunting].' (P3, L187-188)

'Certainly for the higher mammals, I do have a problem there. I mean, if there was a chimpanzee shoot, you wouldn't get me along.' (P6, L487-489)

These findings support previous research that suggested attitudes toward animal use relate to BAM, concerning the animals' similarity to humans in terms of mental ability (Allen, et al., 2002) and their capacity to experience pain and suffering (Herzog & Galvin, 1997). Plous (1993) called this a "hierarchy of privilege" assigned to species, with primates and pet animals occupying the most privileged positions. BAM may, therefore, be a mechanism that enables people to avoid uncomfortable thoughts and feelings when faced with a dissonance between their liking of animals and their use of animals.

### **Physical Characteristics of Animals**

Physical characteristics of animals related to liking animals. This also influenced attitudes toward animal use. Participants preferred animals who were perceived as more physically similar to humans, and support for the use of these types of animals was low. Also, if animals were perceived to be more similar physically to humans, this led to beliefs that they are more similar mentally to humans.

'People are most emotional about things with two eyes, a nose, and a mouth on the front of the face... But the further you go down, the uglier the animal is, the smaller it is, the less like a mammal it is- the less they seem to be compassionate about it. And I think, yeah, if it's got 2 eyes, a nose and a mouth, most of that is in the front of its head, it gets far more compassion than if it has 6 legs, crawls about and has eyes... 8 eyes, hairy legs, and a little body- then no compassion at all'. (P4, L136-146)

'So it then becomes an anthropomorphic decision, as to, it's got a brain, a backbone, it's got eyes, nose, a face -- must be more intelligent, must be more, must feel pain.' (P4, L258-260)

Also, the more attractive and appealing animals were perceived to be, the more animals were liked and the less likely participants were to support use of that animal.

'And I think also, animals that look appealing have an effect, like dolphins, I think everyone would be appalled if they started hunting dolphins'. (P6, L490-492)

The "similarity effect" describes how "people give more consideration to others who are perceived as similar to themselves than to those perceived as dissimilar" (Plous, 1993, p. 32). This effect can be generalized to animals (Allen, et al., 2002) and would explain why people do not support the use of animals who are perceived as more similar to humans, either

physically, mentally, or both. Animals perceived to be less similar also can be subjected to ingroup-outgroup biases, which leads to negative evaluation of the outgroup members and an over-estimation of between group differences (Tajfel, 1970). Thus, if animals are seen as outgroup members, their mental capacities may be underestimated. Although animals experience pain in a similar way to humans (Hoff, 1980), in order to defend their use of animals people continue to ascertain that animals do not feel pain (Herzog & Galvin, 1997). If assigning animals as members of an outgroup is one mechanism for allowing animal use to continue, then psychological research on intergroup relations may help us to understand more about this topic.

### **Knowledge of Animal Use Procedures**

Views on animal use were often discussed in terms of what participants knew about animal use (i.e., what actually happens to animals who are “used”). Participants expressed different levels of knowledge about different types of animal use, with least known about using animals in medical research.

‘I’m sure I would be shocked by quite a lot of things if I did know more about it [animal experimentation], but I don’t.’ (P5, L245-256)

‘I don’t know enough about experimenting on animals to comment really. I don’t know enough to say what is right or wrong.’ (P3, L112-114)

Thus, participants were unlikely to oppose research because of animal use procedures because they actually knew very little about these procedures. Furthermore, most participants claimed that they didn’t know about the procedures because they didn’t want to know. Participants talked about avoiding information concerning animal use because it led to unpleasant feelings of discomfort.

‘I would rather not know.... I don’t make it my business to know, so I suppose that implies that I would rather not know, yeah..... And

when I'm exposed to the facts, like probably a lot of people I recoil a bit, a bit horrified about it -- like oh my god, you know. But so maybe there's a denial of, to an extent, of what goes on, because obviously from time-to-time you read about things and think- that's not very nice, you know.(P2, L135-143)

That participants often stressed that they didn't want to know about animal use, may be because avoidance of animal use (e.g., veganism) requires effort and can lead to psychological, physical, and social difficulties for people choosing this option (McDonald, 2000). Change is likely to be challenging. Thus, dissociation (avoiding knowledge of animal use), or repression (in terms of somehow failing to remember such knowledge) are often the preferred options. Indeed, McDonald stated: "Repression may be a key factor in why many individuals hear about animal cruelty but do not act" (p.19). However, we would argue that the process of avoiding information is less of a form of repression and more a deliberate strategy developed to manage emotion and justify behaviour.

Uncomfortable feelings, caused by knowledge of how animals are used, were also discussed in terms of feeling helpless.

'I think with so many of these issues you think well, you feel so helpless, I mean eating meat- what difference does one person giving up meat have?' (P9, L49-51)

Other participants discussed their feelings toward knowledge of animal use in terms of personal relevance.

'And no, I didn't like to see that kind of animal being used in that kind of way, but if there was a cure for cancer and it affected me personally, I guess I'd have to think some more.' (P9, L22-24)

Thus, it appears that views may be fluid according to how personally relevant animal use is to each individual.

Knowledge occasionally led to outright rejection of animal use practices because participants perceived these to be so unpleasant for animals. Several participants discussed seeing pictures of chemicals being injected into animals eyes during cosmetics testing. Research has found that students who are more likely to encounter animal experimentation in their academic career (students of biology and medicine), are more likely to oppose animal research than are other students (Broida, Tingley, Kimball, & Miele, 1993). Science students, compared to non-science students (Sieber, 1986), are more likely to propose a need for improvement of animal research procedures. Thus, it may be to the advantage of medical research to keep information about animal use procedures from the public, because it seems that knowledge leads to reduced support for such practices. Future research may examine whether students who experienced animal use procedures in their studies are over-represented within animal activist organizations.

### **Cost-Benefit Analysis**

Participants often weighed up the costs of animal use versus the benefits when rationalizing how they could hold different attitudes toward different types of animal use.

'I think it, personally, if you're asking me, yes I think it [animal use] should be weighed up, I think it should be evaluated, the potential benefits against the potential suffering of an animal.' (P2, L76-78)

'But, it [animal experimentation] seems different from, like, dog fighting or badger baiting, or something like this, that, if it was, well- there's some cure for cancer, or there's some kind of specific thing, one might argue that there was a qualitative difference in the moral justification of it, I suppose.' (P3, L22-24)

It seems that "The most persuasive argument for using animals in behavioural research, however, is the untold benefit that accrues to both humans and animals" (Baldwin, 1993, p. 123). However, participants

admitted to knowing little about the costs (distress caused to animals) and perhaps more important, did not want to know (see “Knowledge of Animal Use Procedures” above). Thus, the process of cost-benefit analysis is not always a fair and logical assessment of the pros versus the cons of animal use.

Participants often discussed animal use in relation to their moral beliefs weighing up the rights of the individual animals being used against the possible outcome of finding a cure that could help countless humans. Others expressed how it would be morally wrong not to use animals if cures for disease such as cancers could be the result.

‘And there's an ethical principle that, yeah -- it does raise questions about -- does the animal want to be involved in saving the human race, you know.’ (P12, L78-81)

‘...or if there's a cure to cancer that can be found through using animals then it would be morally wrong not to go down that road.’ (P4, L51-53)

Previous research has found that support for vivisection increases depending on its perceived utility for humans (Braithwaite & Braithwaite, 1982; Tamir & Hamo, 1980) and that people agree with research that causes pain and injury on animals if it is said to provide new information about human health problems (Pifer, et al., 1994). Many people practice moral decision making by comparing the suffering of animals to the benefits to humankind (Wuensch, Jenkins, & Poteat, 2002). Advocates of animal research argue that animal suffering is small compared to the resulting benefits to humankind (Miller, 1985). Thus, it seems that animal suffering is perceived as less important than human suffering. In the present study, the purpose of research clearly was important to participants discussing their views on animal experimentation and is consistent with the views of others (Baldwin, 1993; Pifer, et al., 1994). However, this may not be the case with misanthropes (people who do not

like humans), who are unlikely to see benefits to humans as outweighing the costs of animal suffering (Wuensch, et al., 2002). Future research may examine how personality characteristics such as misanthropy, philanthropy, and idealism influence how people theorize about animal use.

### **Perceptions of Choice**

This theme described how participants discussed whether we have a choice other than using animals and was a central theme mentioned by all participants. This supports existing research that found a factor important in relation to attitudes toward animal experimentation is the necessity of medical research (Pifer, et al., 1994).

Participants seemed to be asking three questions when exploring the concept of choice: "Is animal use necessary?" "How are animals treated?" "Is animal use natural?" Each of these questions will now be addressed.

### ***Is Animal Use Necessary?***

Often, participants justified animal use by saying that the benefits so far outweighed the costs of using animals that we have no choice other than to use animals (when medical research is seeking a cure for cancer).

Furthermore, animal use was deemed necessary if there were no alternatives to using animals. Although participants were aware of cruelty-free cosmetics (i.e. not tested on animals), they rarely could think of a replacement for animals that medical research could use. Thus, support was lower for the former and higher for the latter.

'Yes, it's possible, faced with a situation and if you were to weight the whole matrix of how the animal is used and feels, and what the importance of the research is, yes, you would probably end up with reasons for using animals where the research can only be done, and it's crucial to technology advances, and those sorts of things.(P8, L43-45)



'Well anything, if it's a living, breathing thing, human or animal, it doesn't feel right to be putting it through pain just to prove something if there is an alternative. (P10, L15-18)

However, if uses were perceived as unnecessary in themselves, that is, their outcomes were of no great consequence or frivolous, then participants thought that we do have a choice and thus should choose not to use animals in this way.

'Certainly for entertainment, for decoration, for financial gain, definitely not, there are alternatives. And there's no way you can justify using animals for the vanity of humans- so for make-up, cosmetics, etc.' (P9, L37-40)

Although many participants stated that we should not stop using animals in medical research, they also expressed that time and effort should be spent seeking alternatives and that repetition or duplication was unnecessary.

'... or more time should be spent on seeking other ways of doing the research.' (P8, L48-49)

Clearly, a perceived lack of alternatives was one underlying reason why people are more supportive of using animals in research. Although previous research has found that biology students prefer such alternatives to dissecting real animals (Kinzie, Larsen, Birch, & Boker, 1996), some students believe dissection is the only way to appreciate the intricacies of the body. Further, biology teachers perceive computer-based alternatives to be unacceptable (Barr & Herzog, 2000).

### ***How Are Animals Treated?***

Often, participants made clear that although they accepted that animals had to be used in some ways, they considered it important that animals are treated and killed humanely.

'But I do think that farming can be done in a humane way, and should be done in a humane way. And I do believe that we can give animals a reasonable life, and you can kill them humanely, quickly, painlessly, without too much distress, and I think you should always endeavor to do that.' (P15, L84-88)

Thus, participants believed we have a choice as to how we treat and kill animals and that we should choose to be as humane as possible.

Indeed, attitudes toward animal use do differ according to the amount of pain that the animal is perceived to endure (Miller, 1992; Rajecki, Rasmussen, & Craft, 1993), and people who support research often seek assurance that animals are treated humanely (Baldwin, 1993). However, others found that participants would support research proposed to cause pain and injury on animals when the research might provide new information about human health problems (Pifer, Shimizu, & Pifer, 1994). Thus, it seems that if the outcome of research relates to medical progress, then this outweighs the costs in terms of animal pain and discomfort. Further, although people are against animal use that involves animal pain and discomfort (e.g., they disapprove of "the use of inhumane killing at an abattoir"), their behaviour may contradict this view: They do not disapprove of "eating meat from an abattoir which uses inhumane methods of killing" (Braithwaite & Braithwaite, 1982). The reality is that animals cannot always be treated or killed humanely, animal use inevitably will cause suffering (Serjeant, 1969). Moreover, products such as free-range and organically farmed animal meat take up a small amount of supermarket shelf space, indicating that although people may say that they want animals to be treated and killed humanely, they do not reflect these views in their behaviour by buying these types of animal products.

***Is Animal Use Natural?***

Participants often described the use of animals as natural, implying that humans have no choice other than using animals. In terms of man's instinct to hunt, kill, and eat animals,

'We haven't got the teeth for vegetarians; our make-up makes us meat-eaters, doesn't it?' (P14, L18-20)

This allows us to take less responsibility for participation in animal use if we are "controlled" by our natural instinct. Although this idea may seem an outdated view in this day and age, Herzog (2002) described how for most of human history men have lived as hunter-gatherers and thus, "Our modern skulls house a stone-age mind" (Cosmides & Tooby, 1997, cited in Herzog, 2002, p. 361). However, we might argue that we are more than this because humans clearly show evidence of moral reasoning. Thus, using our natural instinct as a reason for animal use may be a convenient excuse that would not hold up to empirical scrutiny (many humans do abstain from eating meat and therefore are not "controlled" by their instinct).

Similarly, participants described how we treat animals within the context of the circle of life. Animal use was seen as a natural behaviour as part of our place in this circle, and participants justified this further by emphasizing how animals behave with each other.

'And I think within a man that hunter, I think the hunting instinct's there, I really do, I think it just goes back right to the times of old, and it is in them, it's in their blood to do it, just as much as it's in my blood to do womanly things it's in their blood to do the manly things, and that's one of them.' (P3, L139-144)

'...but I must say, I am a meat eater, I am a carnivore. I keep on feeling my incisors, we've got the incisors for cutting meat, we've got canines for tearing meat, so, if you look at our other primates, like chimps, they eat other monkeys, don't they? They go off, and get some meat.' (P1, L412-417)

Thus, by comparing human actions to animal behaviour, our own behaviour seems reasonable. Further, the notion of eating meat as a natural instinct may relieve us of any guilt that may come from eating animals. It may be a psychological mechanism that reduces personal conflict (Plous, 1993). Such ideas also may be deeply ingrained within our culture (Griffith, Wolch, & Lassiter, 2002). So, cultural norms can enable us to believe that we have no alternative other than to eat meat because that is what nature intended. Indeed, Plous found that children are taught that eating meat is necessary for adequate nutrition, although animal-based diets can be unhealthy. It is, therefore, not surprising that people use this as justification for animal use.

### **Ideas for Future Research**

The findings from this research raise many interesting questions that may form the basis for further research. For example, how do people who support and/or practice animal use avoid discomfort when faced with an animal who clearly is suffering as a result of this practice? Thus, future research should include people with scientific knowledge of animal experimentation issues and those actively involved in animal use.

Findings from this research also may relate to attitudinal research on a wider, theoretical level. How are the themes that emerged from discussing attitudes toward animal use similar to those underlying views toward other attitude objects? Three of our four themes (knowledge of animal use, perceptions of choice, and cost–benefit analysis) are similar to those found to emerge from discussions with parents concerning their views on the combined MMR (measles, mumps, rubella) vaccine for children (Buckley, 2002). Thus, similar cognitive processes may be at work when people are considering their views on issues other than animal use.

### **A Reflection on the Methodology Used in This Study**

Herzog (1993) proposed that it is usual in qualitative research for researchers to describe their personal perspective and potential biases. Although I am fond of animals, my stance (first author) is that I find it hard to oppose certain types of animal use such as medical research that seeks to find cures for serious diseases. Thus, I am aware this is a paradox I may share with participants and that my views may impinge on my interpretations of the data. Indeed, in the free-flowing dialogues of in-depth exploration of inductive Grounded Theory interviews, it is hard to see how my own position always is hidden from the participants, and this may constitute a conceptual problem for Grounded Theory methodology. In practice, the interviewer is engaged in an interaction with the interviewee, and the interviewer is not in a position to extract pristine and untainted data from the interviewee. However, the aim of this study is to search for the theories of participants, not to seek the confirmation or rejection of an existing theory on animal use. In a serious sense, I have tried to avoid imposing my personal theory on participants during interviews and later during analysis.

### **Conclusions**

Animal use is often described as natural, necessary, inevitable (Plous, 1993), yet people are naïve about animal use. They don't know and, more importantly, don't want to know about the sometimes unpleasant procedures involved in animal use. Further investigation is needed that focuses on people's motivation to maintain an attitude or behaviour and examines the underlying processing of factors relating to the animal and type of use, rather than trying to explain attitude variance in terms of personal variables such as gender and age. By acknowledging this, we may develop a more rounded and more detailed understanding of people's views on how animals are used.

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## **CHAPTER 4**

### **STUDY 3: PSYCHOLOGICAL FACTORS UNDERLYING ATTITUDES TOWARD THE USE OF NON-HUMAN ANIMALS**

#### **AIMS:**

1. To develop a questionnaire that provides a quantitative measure of psychological factors identified in Study 2.
2. To gain quantitative evidence for the psychological factors identified in Study 2.
3. To measure the relative importance of psychological factors in relation to attitudes toward different types of animal use.

**ABSTRACT**

Using qualitative methods, Knight, Nunkoosing, Vrij, & Cherryman (2003) found that different attitudes towards animal use could largely be explained by people's beliefs and perceptions concerning animals and animal use. The present research used a questionnaire (N= 163) to gain quantitative evidence for seven psychological factors that underlie attitudes toward animal use, and examined the relative importance of each of these in relation to participant's opinions concerning four different types of animal use. These were using animals for medical research, dissection, and personal decoration (all resulting in high costs to animals), and for entertainment (low in costs). It was hypothesised that the seven factors examined would explain why people hold different attitudes toward different types of animal use; this prediction was supported. Combinations of these factors underlying attitudes were found to differ depending upon the type of animal use in question. Participant's perceptions concerning whether there are alternatives to using animals ("perceptions of choice") accounted for most of the variance in attitudes toward animal uses that are high in cost. We conclude that psychological factors have a significant impact on attitudes toward animal use, and discuss findings in relation to cognitive dissonance theory.

## INTRODUCTION

Animals often mean a great deal to us, yet are used extensively within virtually all societies. The term “animal use” describes the use of animals by humans, and includes a wide spectrum of practices, from, for example, using animals in invasive medical research, to breeding for fur, to keeping animals for companionship. Many animal use procedures lead to a range of negative consequences (i.e., “costs”) for the large numbers of animals involved; therefore humans are presented with a predicament if we are fond of animals but wish to gain from such practices. Clearly, attitudes toward animal use are complex and may be influenced by a number of different variables. The present study examines the psychological factors that underlie attitudes toward different types of animal use in order to understand how we can feel great affection for animals on one hand, yet condone animal use on the other.

Qualitative research found that when theorising about their views on different types of animal use, participants discussed their knowledge of animal use procedures in terms of what actually happens to the animals involved, particularly in terms of whether practices led to either high or low costs to animals (Knight, Nunkoosing, Vrij, & Cherryman, 2003). If the costs were perceived to be low, that is, if animal use was not considered to cause physical or psychological harm to large numbers of animals, then animal use was generally accepted with little consideration of other factors. However, when the costs were perceived to be high (i.e., causing pain, discomfort, and/ or death to large numbers of animals), then other factors such as the benefits of animal use, whether there are alternatives to animal use, a person’s affection for animals, and so on, were considered, in order to weigh up whether those costs could be justified. That is, when animal use is associated with high costs then people enter into an in-depth analysis of relevant issues such as alternatives to using animals. However, when animal use is associated with low costs to the animals involved, then practices are usually perceived as fairly acceptable

with little need for a consideration of factors such as available alternatives, and so on.

The present study investigated combinations of factors that underlie attitudes toward using animals for (i) medical research (e.g., testing of drugs or medical procedures); (ii) dissection for teaching purposes (e.g., teaching medical or veterinarian students); (iii) personal decoration (e.g., cosmetics testing, making products from animal skin); and (iv) entertainment (e.g., fox hunting, keeping animals in zoos); these being recognized as important by previous researchers (Armstrong & Hutchins, 1997; Matthews & Herzog, 1996). It was thought that the former three were likely to be associated with high costs to animals because these can cause suffering and death to large numbers of animals involved, whilst the latter would be associated with low costs to animals because they do not. Predictions were made that combinations of factors found to underlie attitudes toward types of animal use would differ depending upon whether animal use was associated with high costs or low costs. The seven factors examined were “perceived benefits”, “perceptions of choice”, “affection for animals”, “experience of animals”, “appearance of animals”, “humans as superior”, and “need for control”.

### **The perceived benefits of animal use**

When the costs of a particular type of animal use are perceived to be high and people are thinking about their views on this type of animal use, one factor that they will consider is the outcomes in terms of the benefits of animal use. Cost-benefit analysis involves people attaching a value to both the perceived costs and benefits of animal use, and then weighing these values up against each other. If the benefits are considered to outweigh the costs then support for animal use is higher, and vice versa (Knight, et al., 2003). Thus, the perceived ratio between the costs and the benefits of the type of animal use in question will, at least partly, determine a person's view towards that type of animal use. Since human diseases have heavy

emotional, social, and economic costs, using animals for medical research be defended because the benefits of such are clear and of high value to humans (Driscoll & Bateson, 1988). Dissection is also often highly valued since it represents a method for teaching students of medicine, veterinary practice, etc.. However, people often show less support for other types of animal use (e.g., cosmetics testing) because they are less likely to perceive the benefits as outweighing the costs (Knight, et al., 2003). The present research examines perceived benefits in relation to attitudes toward types of animal use where costs are perceived to be both high and low. It was expected that perceived benefits would emerge as a predictor of attitudes toward the use of animals only when the costs are likely to be perceived as high (i.e., for medical research, dissection, and personal decoration, not for entertainment) (Hypothesis 1).

### **Perceptions of choice**

When costs are perceived to be high, another issue people consider when theorising about their views on animal use is whether they perceive there to be alternatives to using animals (i.e., “perceptions of choice”) (Knight, et al., 2003). When people see that there is nothing else that can be used instead of animals, then they are more likely to accept animal use as necessary, compared to when alternatives or replacements are obvious. For example, alternatives to using animals for medical research (e.g., dissection in order to teach medical procedures, or using animals to test a new drug), are often difficult to envisage, therefore support is likely to be relatively high. In fact, the argument that we have no alternative but to use animals is often used to defend using animals for research and teaching (Feeney, 1987; Furnham & Pinder, 1990; Gallup & Suarez, 1985). Conversely, in terms of using animals for personal decoration, alternatives are more obvious and easily accessible to the general public. For example, cruelty-free cosmetics are widely available as an alternative to cosmetics that have been tested on animals, as are fake-fur and other fabrics as alternatives to fur. The present study examines perceptions of

choice in relation to different types of animal use. It was thought that whether there were alternatives to using animals would be considered only when the costs were likely to be perceived as high, not if costs to animals were likely to be perceived as low. Therefore the second hypothesis predicted that perceptions of choice would emerge as a significant predictor of attitudes toward the use of animals only for medical research, dissection, and personal decoration (not for entertainment).

### **Affection for animals, experience, and appearance**

Another factor that will influence attitudes toward animal use is a person's attitudes toward animals (i.e., "affection for animals"), in terms of how much they actually like animals. If a person feels affection for animals, they are likely to feel uncomfortable about practices that might cause discomfort or pain to such creatures, whilst a person who dislikes animals is more likely to support animal use. Hence, as a general rule, the more affectionate a person feels toward animals, the less they will support animal use (Hemsworth, 2003; Knight, et al., 2003). However, opinions of animal use may be dependent upon the type of animal involved<sup>1</sup>, in that people may approve of the use of some animals but not others. This will depend upon factors such as their experience and the perceived attractiveness of particular types of animals (Hagelin, Johansson, Hau, & Carlson, 2002; Herzog & Galvin, 1997; Hills, 1993; 1995; Knight, et al., 2003; Plous, 1993; Serpell, 2004; Tannenbaum, 1993). People's attitudes toward animals are based on their contact and experiences with animals (Wells & Hepper, 1997; Paul & Serpell, 1993). Positive experiences with animals via pet ownership are therefore likely to lead to reduced support for animal use. Compared to non-pet owners, pet owners are less supportive of using animals for research (Driscoll, 1992). More specifically, people will oppose the use of animals that they are most likely to have had

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<sup>1</sup> Whilst we emphasize that species of animal will have an effect on people's views toward animal use, this study focuses on factors underlying attitudes in order to understand why people have different attitudes toward different types of animal use. To include the examination of attitudes towards the use of different species of animals is beyond the scope of the present research.

experience with, such as popular pet animals, and support the use of less-familiar animals (Knight, et al., 2003; Plous, 1993; Podberscek, Paul, & Serpell, 2000). People also often feel more affection for animals that are attractive, which is why they are less supportive of using animals that are perceived as “attractive”, “cute” or aesthetically appealing (Hagelin, et al., 2002; Herzog & Burghardt, 1988; Serpell, 1986; 2002). The present study included measures of affection for animals, experience of animals, and appearance of animals. It was predicted that these factors would be considered only when considering types of animal use associated with high costs to the animals involved (i.e., for medical research, dissection, and personal decoration, not for entertainment) (Hypothesis 3).

### **Humans as superior to animals**

When considering whether animal use is acceptable or not, the comparative value of the needs of humans and animals is also often compared. If people value human needs as more important than those of animals (“humans as superior”), then this can be used as an argument in support of animal use. Some people support the use of animals for medical research because they believe that such practices might lead to advances in medical progress for the benefit of humans, whilst others argue that animals are of equal importance to humans and therefore should not be used. That is, those who attach more importance to the needs of humans compared to those of animals, use this to justify animal use (Knight, et al., 2003). Hence, it was expected that for types of animal use usually associated with high costs, humans as superior would be another factor that would be considered within the judgement-making process. Therefore Hypothesis 4 predicted that this factor would emerge as a significant predictor of attitudes toward the use of animals for medical research, dissection and personal decoration (not for entertainment).

**Animal populations and the need for control**

When considering whether the use of animals is acceptable, another factor that can influence the judgement-making process is a person's belief concerning whether animal populations need to be controlled by humans ("need for control"). It might be argued that when humans hunt some animals (e.g., foxes), this benefits other animals (e.g., rabbits, chickens), or it may be proposed that such practices can actually benefit the fox population, since it is usually the old or sick animals that are caught (Knight, et al., 2003). Hence some people believe that human control of animal populations is both advantageous and necessary, whilst others argue that we are upsetting the balance of nature by taking control in this way, and that human intervention in terms of population control is unnecessary. Since need for control does not relate to the use of animals for medical research, dissection or personal decoration, but does relate to the use of animals for entertainment (i.e., hunting for sport), Hypothesis 5 predicted that this factor would emerge as a predictor of only attitudes toward the use of animals for entertainment (not for medical research, dissection, and personal decoration).

**Attitudes towards different types of animal use**

Because people are likely to have a general view on using animals (in that they generally either support or are against animal use), Hypothesis 6 predicted that there would be high correlations between attitudes toward different types of animal use. However, Hypothesis 7 predicted that participants would show different levels of support for different types of animal use, in that they would be significantly more supportive of using animals for medical research and dissection, compared to using animals for entertainment and personal decoration purposes. This is because using animals for research and dissection are often believed to lead to high-value benefits, and because alternatives to such are perceived as few.



## **METHOD**

### **Participants**

The sample comprised 163 participants living in or around the area of Portsmouth and the Isle of Wight (an area in the South of England), with 48% of participants male, 52% female, and a mean age was 40.8 years ( $SD = 14.12$ , skewness = 0.1).

### **Procedure and background information**

Two methods of data collection were used; opportunity sampling and snowballing. Initially it was intended that all data would be collected via convenience methods, however, because the questionnaire took between 20-30 minutes to complete, people asked in public places were reluctant to take part. It was therefore decided that snowballing methods would also be used, and people known to the researcher were asked to take part and then provide the name of somebody they knew who would be likely to participate, who in turn recommended another potential participant. Hence, only a small number of initial participants were known to the researcher. To avoid a skew in the data, participants were asked if they could propose someone who they thought were likely to present a view different to their own (in relation to animal use issues). Responses were compared during data screening in order to check for any bias in the data relating to the two data collection methods. The final sample comprised 70.6% enlisted via snowballing methods and 29.4% via convenience sampling. To examine whether participants sampled via convenience methods held different views to those sampled by snowballing methods, two ANOVAs compared overall mean scores for attitudes towards animal use (i.e., the average score of those items categorised as shown in Table 4.1). Since no significant differences were found between groups for attitudes toward animal use ( $F(1,161) = 1.82$ ,  $p = 0.18$ ), all subsequent analyses examine the sample as a whole (i.e. do not distinguish between these two groups).

**The questionnaire**

A questionnaire design was used for this study, divided into two sections as follows: attitudes toward animal use, and factors underlying attitudes (See Appendix V for questionnaire).

**Attitudes toward animal use**

The first section measured attitudes towards animal use, comprising twenty-five statements originally developed by Armstrong and Hutchins (1996) and Matthews and Herzog (1997). Each statement was followed by a 7-point Likert scale (from “highly unacceptable” to “highly acceptable”). Each of these were proposed to measure attitudes toward four different types of animal use (for medical research, dissection, entertainment, and personal decoration). Cronbach's alpha was calculated, indicating high internal reliability within these clusters (see Table 4.1).

**Table 4.1. Items measuring attitudes towards animal use and internal reliability of categories**

Category	Items (all beginning with 'In my opinion...')	Cronbach's alpha
Medical research	using rodents for medical research is...	.97
	using cats for medical research is...	
	using dogs for medical research is...	
	using pigs for medical research is...	
	using monkeys for medical research is...	
	using guinea pigs for medical research is...	
	using rabbits for medical research is...	
Dissection	using rodents for dissection to teach students (e.g. biology) is...	.96
	using guinea pigs for dissection to teach students (e.g. biology) is...	
	using pigs for dissection to teach students (e.g. biology) is...	
Entertainment	keeping animals in zoos is...	.94
	keeping big cats in zoos is...	
	keeping monkeys in zoos is...	
	keeping chimpanzees and apes in zoos is...	
	hunting foxes for sport is...	
	hunting deer for sport is...	
Personal decoration	using rodents to test toiletries and cosmetics is...	.93
	using rabbits to test toiletries and cosmetics is...	
	using guinea pigs to test toiletries and cosmetics is...	
	using cats to test toiletries and cosmetics is...	
	making products (e.g. clothing, shoes, bags) from the skin/ fur of dogs is...	
	making products (e.g. clothing, shoes, bags) from the skin/ fur of rabbits is...	
	making products (e.g. clothing, shoes, bags) from the skin/ fur of mink is...	
	making products (e.g. clothing, shoes, bags) from the skin/ fur of pigs is...	
	making products (e.g. clothing, shoes, bags) from the skin/ fur of cows is...	

### **Factors underlying attitudes toward animal use**

The second section consisted of 44 statements<sup>2</sup> representing seven factors that underlie attitudes towards animal use, these being perceived benefits, perceptions of choice, affection for animals, appearance of animals, experience of animals, humans as superior, and need for control. These statements were based on interview transcripts from the qualitative research by Knight, et al. (2003). All statements were accompanied by a 7-point Likert scale (from “I disagree completely” to “I agree completely”).

Factor analysis (principal components factoring, varimax rotation) conducted on the section two items revealed seven factors (see Table 4.2). These reflected the original seven factors, except for experience of animals. Two of the statements (items referring to positive experiences of animals) representing this factor loaded together with affection for animals, whilst the other two (referring to negative experiences with animals) loaded as a separate factor, which was redefined as a new, separate factor, and labelled “negative experiences with animals” (i.e., the “experience of animals” factor no longer existed).

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<sup>2</sup> Of these 44 statements, 16 measured an additional three factors not mentioned in this article. These were labelled “belief in animal mind”, “moral reasoning” and “animal use as natural”, all identified as less central factors in the Knight, Nunkoosing, et al. (2004) study. However, when Factor Analysis was conducted, the statements representing these three factors did not reach our criteria for factors (in that there should be at least three items loading on one factor only, all with loadings exceeding 0.5) (as advised by Field, 2000), and so these statements were not included in subsequent analyses. This is why only 28 items are discussed from this point forward.

**Table 4.2. Factors (and eigenvalue) underlying attitudes**

Factor labels	Items
Affection for animals (13.82)	<ul style="list-style-type: none"> <li>- Animals give me a lot of pleasure</li> <li>- I am extremely fond of animals</li> <li>- I don't really like animals</li> <li>- Most animals are horrible</li> <li>- Animals can give you happiness</li> <li>- I've had good times with animals in my life</li> </ul>
Perceptions of choice (3.51)	<ul style="list-style-type: none"> <li>- There is no substitute to using animals</li> <li>- Humans don't have to use animals</li> <li>- There's nothing else we can use instead of animals so we have no alternative</li> <li>- I guess that most of the time we have to use animals because we've not got much choice</li> </ul>
Perceived benefits (2.33)	<ul style="list-style-type: none"> <li>- Whatever the outcomes of animal use are- I don't believe it's right to start weighing up the benefits against the costs</li> <li>- You have to consider what happens to the animals and what the end result is, then you can decide whether animal use is right or wrong</li> <li>- I think using animals should be evaluated- think about the outcomes compared to what the animal goes through- then you can decide whether it's acceptable or not</li> <li>- You can't decide whether animal use is acceptable by simply weighing up the benefits to humans against the costs to animals- it's not that simple</li> </ul>
Need for control (1.92)	<ul style="list-style-type: none"> <li>- Animals can breed in mass production so we need to take charge of the situation by controlling the numbers of different species</li> <li>- If we left it to nature, populations of animals would manage each other</li> <li>- We do need to control the numbers of animals, or things would get out of hand</li> <li>- Mother nature is an expert in natural selection</li> </ul>
Humans as superior (1.48)	<ul style="list-style-type: none"> <li>- I do not believe that humans are superior to animals</li> <li>- There's no way animals are less important than us as human beings</li> <li>- In my opinion, animals are definitely inferior to humans</li> <li>- I think that humans are more worthy than animals</li> </ul>
Appearance of animals (1.32)	<ul style="list-style-type: none"> <li>- Whether we use animals should depend upon how attractive, cute or fluffy they are</li> <li>- I would prefer to see the ugly animals being used, rather than the cuter types of animals</li> <li>- When I'm thinking about my views on animal use- it doesn't matter what animals look like</li> <li>- An animal's appearance has nothing to do with my attitudes towards animal use</li> </ul>
Negative experiences with animals (1.06)	<ul style="list-style-type: none"> <li>- I've had bad experiences with animals</li> <li>- Animals have given me a fright in the past</li> </ul>

## Design

The seven factors described above were analysed in relation to attitudes toward different types of animal use using Multiple Regression Analysis. All regression analyses were conducted using methods recommended by Field (2000, p.143), described as follows. First, four separate hierarchical

(or blockwise) regression analyses (one for each type of animal use) were used to identify which factors (of the seven shown in Table 4.2) were significant predictors of attitudes towards each type of animal use. Based on the results, an additional four separate regression analyses (using the forward stepwise technique) were conducted, this time excluding those variables that had not emerged as significant predictors in the previous hierarchical regression analyses. Thus, combinations of factors entered in these latter analyses were different for each type of animal use, depending upon the results of the former analyses. Only these latter regression analyses are reported below. Also conducted was a mixed design ANOVA to compare attitudes toward different types of animal use, and Pearson's correlation in order to examine the relationship between attitudes toward different types of animal use.

## RESULTS

Regression analyses for each type of animal use is reported below. Table 4.3 shows the combinations and the impact (in terms of the  $R^2$  and  $F$  values) of each factor as it was entered in to the model, and correlations demonstrate the direction of the relationship between the factors and attitudes toward each type of animal use.

**Table 4.3. Impact of each factor on models predicting attitudes**

Type of animal use	Factor	R <sup>2</sup> change	F values (for model)	Pearson Correlation
Medical research	Perceptions of choice	.456	134.719**	.675*
	Humans as superior	.087	95.065**	.639*
	Perceived benefits	.047	76.281**	.595*
	Negative experiences with animals	.019	61.653**	.411*
	Affection for animals	.012	51.570**	.584*
	Total R <sup>2</sup>	.622		
Dissection	Perceptions of choice	.385	100.928**	.621*
	Humans as superior	.082	70.181**	.599*
	Perceived benefits	.033	52.979**	.535*
	Total R <sup>2</sup>	.500		
Entertainment	Need for control	.412	112.724**	.642*
	Humans as superior	.064	72.613**	.577*
	Total R <sup>2</sup>	.476		
Personal decoration	Perceptions of choice	.419	116.329**	.648*
	Humans as superior	.091	83.293**	.627*
	Affection for animals	.034	63.158**	.620*
	Perceived benefits	.022	51.419**	.509*
	Total R <sup>2</sup>	.607		

\* represents  $p < .01$  level of significance, \*\* represents  $p < .001$  level of significance.

NOTE: Data was coded so that higher scores represent: belief that there are no alternatives; that humans are superior to animals; that perceived benefits were considered; more negative experiences with animals; less positive affection for animals; and belief in the need for humans to control animal populations.

### **Attitudes toward high cost animal use practices**

#### ***Using animals for medical research***

The factor that most explained people's attitudes toward using animals for medical research was perceptions of choice. This factor accounted for 46% of the variance, whilst humans as superior, perceived benefits, negative experiences with animals, affection for animals, and need for control were also significant predictors (together accounting for nearly 17% of the variance). The total model accounted for 62% of the variance in attitudes toward the use of animals for medical research.

#### ***Using animals for dissection***

Perceptions of choice most explained attitudes toward using animals for dissection purposes, accounting for 39% of the variance in participant's views. Humans as superior and perceived benefits again emerged as significant predictors (together accounting for 11% of the variance), and the total model explained 50% of the variance in attitudes toward the use of animals for dissection.

#### ***Using animals for personal decoration***

Again, perceptions of choice accounted for most of the variance (42%) in participant's views on the use of animals for personal decoration. Other significant predictors were humans as superior, perceived benefits, and affection for animals (together accounting for 15%), with the total model explaining 57% of the variance in attitudes toward the use of animals for personal decoration.



## Attitudes toward low cost animal use practices

### *Using animals for entertainment*

Need for control was the factor that most explained people's attitudes toward using animals for entertainment, accounting for 41% of the variance. Humans as superior was also a significant predictor (explaining nearly 7% of the variance). The total model accounted for 48% of the variance in people's views on the use of animals for entertainment.

## Attitudes toward different types of animal use

High correlations were revealed between attitudes towards the four types of animal use (see Table 4.4), indicating that attitudes towards different types of animal use are related. That is, people tend to hold a general view towards different ways in which animals are used, in that they generally show support for all types of use, or generally oppose all types of use.

**Table 4.4. Correlations between attitudes towards different types of animal use**

	Medical research	Dissection	Entertainment	Personal decoration	Overall attitudes
Medical research		.72**	.67**	.79**	.91**
Dissection			.66**	.74**	.88**
Entertainment				.73**	.83**
Personal decoration					.89**

\*\* represents significant at 0.01 level.

A repeated measures ANOVA was conducted (where different types of animal use was the within-subjects factor) to compare mean scores representing attitudes toward different types of animal use (see Table 4.5). This led to a significant effect ( $F(1,162) = 82.71, p < 0.001$ ), and post-hoc comparisons showed significant differences between attitudes towards all types of animal use (all differences at  $p < 0.01$  level). Most support was shown for using animals for dissection purposes and least support for using animals for personal decoration. There was more support for using

animals for dissection and medical research, compared to entertainment and personal decoration, thus people do hold different attitudes toward different types of animal use.

**Table 4.5. Mean scores for attitudes towards different ways in which animals are used**

Category	Mean score (overall)	SD
Dissection	4.31d	2.17
Medical research	3.85c	2.22
Entertainment	3.46b	1.82
Personal decoration	3.04a	1.64

Note: High scores represent more support for animal use, and all mean scores differed significantly from each other ( $p < .01$ ). Scores with different subscripts differ significantly from each other.

### Summary of findings in relation to predictions

Perceived benefits, perceptions of choice, and humans as superior emerged as significant predictors of attitudes toward animal use associated with high costs (medical research, dissection, and personal decoration), and affection for animals was a predictor of attitudes toward the use of animals for medical research and personal decoration. With the exception of humans as superior, none of these factors emerged as predictors of attitudes toward animal use associated with low costs (entertainment). Hence Hypotheses 1 - 4 were, in the main, supported. Appearance of animals and negative experiences of animals were not revealed as predictors of attitudes toward animal use, indicating that these are less important in relation to views on this subject. Hypothesis 5 was supported since need for control emerged as a significant predictor of attitudes toward entertainment. There were high correlations between attitudes toward different types of animal use, but significant differences between attitudes towards all types of animal use, therefore Hypotheses 6 and 7 were also supported.

## **DISCUSSION**

People's views on animal use are clearly not uni-dimensional, as some research has suggested (e.g., Armstrong & Hutchins, 1996), but rich and complex in terms of the factors that underlie these views, the relative importance of these factors, and how they interrelate. The present study found quantitative evidence for psychological factors that underlie attitudes toward animal use as identified previously by Knight, et al. (2003). These represented perceptions and beliefs concerning animals and animal use. It emerged that combination of factors underlying attitudes towards different types of animal use differed, as did the strength of their impact, depending upon whether the animal use was likely to be associated with either high or low costs to the animals involved. One factor in particular, "perceptions of choice", was a strong predictor of attitudes toward uses associated with high costs (medical research, dissection, and personal decoration), this factor alone accounting for a large amount of the variance in people's attitudes toward these types of animal use. It seems that one key determinant of the complexity of people's attitudes is whether the type of animal use is associated with high or low costs to the animals involved. If the type of animal use is perceived to be high in costs, then more complex processing is required since participants need to decide whether such costs can be justified.

### **Perceptions and beliefs underlying attitudes toward animal use**

Factors that emerged as significant were perceptions of choice, humans as superior, and perceived benefits, and, to a small extent, affection for animals, negative experiences with animals, and need for control. Models predicting attitudes toward the different types of animal use each consisted of similar, but different, combinations of these factors, and the relative importance of factors differed for different animal use categories. For example, perceptions of choice, humans as superior, and perceived benefits were important in relation to attitudes toward medical research and dissection, where alternatives are less evident and benefits can be

perceived as high in value, which would explain why participants were significantly more supportive of using animals for research and dissection compared to other types of use. Perceptions of choice, humans as superior, and perceived benefits were not important predictors of attitudes towards using animals for entertainment and personal decoration, where alternatives are more obvious and benefits less so, which may be why support for these practices was significantly lower. For attitudes toward using animals for entertainment (e.g., keeping animals in zoos), the costs and benefits may both be seen as low in value, therefore cost-benefit analysis is not needed, and hence other factors such as perceptions of human-animal relationships (e.g., that humans are superior to animals) provides the justification for such animal use. For attitudes towards using animals for personal decoration, views about animals was most important, perhaps because the costs are perceived as high and benefits low in value (i.e. the benefits do not outweigh the costs), and therefore people's views about animals become important and support is lower.

That different combinations of factors underlying attitudes towards different types of animal use, helps explain why people hold such different and conflicting attitudes towards different ways in which animals are used. Perceptions of choice was the strongest predictor of attitudes toward the use of animals for medical research, dissection, and personal decoration, where alternatives are less evident for the former two and more obvious for the latter. People believe the availability of alternatives to be an important factor when considering their views on animal use; if alternatives are perceived to exist then support is lower, and vice versa. This explains why participants were most supportive of the use of animals for medical research and dissection, and least supportive of using animals for personal decoration. Hence, people's decisions concerning whether animal use is acceptable or not will depend upon the type of animal use in question, whether this is associated with high or low costs to animals, and factors such as the perceived alternatives, the benefits of animal use, and

so on. People's views on animal use are clearly not uni-dimensional, as some research has suggested (e.g., Armstrong & Hutchins, 1996), but rich and complex in terms of the factors that underlie these views, the relative importance of these factors, and how they interrelate.

### **Attitudes toward the use of animals for medical research and dissection purposes**

Support for medical research and dissection for teaching purposes was significantly higher than support for entertainment and personal decoration, and these were predicted by the same combination of factors. This indicates analogous thought processes behind attitudes towards animal use procedures such as drug testing or dissection to teach biology, which explains why views on these issues are similar. In fact, there is some crossover between using animals for medical research and dissection, in that the former can involve the latter, and vice versa. Furthermore, elements of the two are the same, for example, both may share similar outcomes that are perceived as high in value (e.g., medical progress) and both may be perceived as essential due to the lack of available alternatives (supported by Baldwin, 1993; Gray, 1987). This would explain why the combinations of underlying factors were the same for using animals for medical research and dissection. However, participants were significantly more supportive of using animals for dissection, compared to medical research. This might be because, whilst the benefits of both may be perceived as high value, the costs may be perceived as lower in value for dissection as it mostly entails the use of dead animals, whereas costs may be perceived as high in value in medical research because it is practiced mostly on live animals (i.e., potentially causing more suffering to the animals involved than if they were dead). Since "views about animals" was a significant predictor of attitudes towards both of these types of use, yet support remained significantly high for these, it is likely that in such cases other factors (such as lack of alternatives or highly valued benefits) were more important and

superseded people's views about animals. This explains why people can hold positive views about animals, yet still support the use of such animals for medical research and dissection purposes.

### **Attitudes toward the use of animals for entertainment and personal decoration**

Significantly less support was shown for using animals for entertainment and personal decoration, compared to medical research and dissection purposes. For attitudes toward using animals for entertainment, beliefs concerning a need for control and humans as superior were important. These factors explain why people might support activities such as the hunting of fox and deer (and are often used to defend such practices). In terms of keeping animals in zoos, people may relate their views on this subject with their beliefs that humans are superior, perhaps due to the historical development of man's relationship with animals. That is, historians have described the discovery of the natural world by humans relating to the belief that humans are superior to animals, and thus somehow we have the right to treat animals as we wish (see Thomas, 1984). This has led to us hunting and capturing animals for companions or to observe for our pleasure. For example animals have been taken out of their natural environment and kept as companion animals, placed in zoos, taught to perform in circuses, and used in sport. The belief that such practices are somehow inherent in our nature and that animals are inferior to humans, thus allow us to support using animals for own entertainment. However, in more recent times, such a belief may be declining and seem outdated, and this could explain why support for using animals for entertainment is less than for research and dissection.

Participants were probably less supportive of using animals for personal decoration (compared to for medical research and dissection) because, when thinking about practices such as testing cosmetics on animals and making products from animal skin/fur, the costs are perceived as high in

value and the benefits low, and so factors such as their attitudes towards animals become more important. That benefits are low in value means that there is little justification for using animals for cosmetics testing or wearing fur, and in such cases people may then rely on their views towards animals and the human-animal relationship. Thus, if they are fond of animals (as most people are), then this would explain why support is less. Finally, that alternatives to using animals for personal decoration are obvious (e.g., cruelty-free cosmetics and fake fur products) will be another reason why support for such practices is likely to be low.

### **Future directions for research into attitudes toward animal use**

Whilst we acknowledge that the present study comprised a relatively small sample that was not random, we are confident that our results can be used to inform future research in this area. For instance, the finding that different factors were important in relation to different types of animal use indicates an interesting path for further research. For example, do similar combinations of factors (found in the present study) emerge as important when examining the views of other groups of people such as scientists who practice research on animals or anti-vivisectionists? It may be that examination of different groups of people may reveal factors underlying their views that are different to laypersons such as the participants in the present study. For example, scientists may defend their work by focusing on the high value of their work (i.e., perceived benefits may be most important), whilst anti-vivisectionists may defend their view by focusing on their attitudes and experience of animals.

Little is known about humans as superior and need for control. Together these factors seem to represent a perception of the human-animal relationship, and as such may be examined in relation to Kellert's typology that consisted of ten different perceptions of animals. Two of the most prevalent of these are labelled "moralistic" and "utilitarian", and, in simple terms, these represent two broad and conflicting dimensions, with the

former opposing, and the latter endorsing, the utilization of animals for human benefit (Kellert, 1980). The factors that reflect beliefs that humans are superior to animals and that animal populations need humans to control them, may underlie Kellert's "moralistic" and "utilitarian" categories. Future research is needed to examine this further, and may also entail the manipulation of factors such as perceptions of choice, cost-benefit processes, etc. to establish causal relationships between these factors and attitudes towards animal use (see Opatow, 1993, for an example of interesting methodology), since most research in this area relies on correlations to imply relationships between factors. More research in this area is needed in order to clarify the nature, strength, and direction of the relationships between these factors and attitudes toward animal use.

Another topic for future research could examine what happens when people do not have the information necessary to develop an informed opinion on animal use issues, for example when they are lacking knowledge of the costs, benefits, or alternatives that might be available. Driscoll and Bateson's ethical decision-making model relies on knowledge of quality of research, certainty of benefits to humans, and animal suffering (Driscoll & Bateson, 1988), and may be helpful to those involved in using animals who have the relevant information available to them. However, laypersons are less likely to have an understanding of such issues, and it seems that in such cases people may ignore that information is lacking. That is, their views on animal use may be based on their knowledge of the benefits alone, or on more general factors such as whether animals are viewed as inferior to humans. This may be why the importance of factors varied in relation to attitudes toward different types of animal use.

From a wider theoretical perspective, it would be interesting to examine the findings from the present research in relation to attitudes towards other issues. For example, people involved in the abortion debate use issues relating to perceptions of choice to persuade or dissuade others, such as;



should the expectant woman have the right to choose whether she terminates the pregnancy or not, are there alternatives to aborting the foetus (such as having the baby adopted), and so on (Wilcox & Norrander, 2002). There may be some overlap between arguments used in the abortion debate and other factors examined in the present study, for example consideration of the costs (such as the effect of the pregnancy on the mother's physical and/or emotional health) and benefits (a potential human life). Others have considered the morality of using foetal tissue to develop health benefits for humans (see Alvarez & Brehm, 1995; Jelen & Wilcox, 2003). The similarities between issues relating to the rights of the unborn foetus and that of animal rights would make an interesting basis for further research. Another path for possible investigation could look at attitudes towards vaccines, since Buckley (2002) found four factors that were important in relation to parents' views on the MMR vaccination, with three of these very similar to those identified by Knight et al. (2003) (i.e., cost-benefit analysis, perceptions of choice, and knowledge of procedures). Buckley's fourth factor was confidence in those responsible for the vaccines (e.g., the government). In relation to this, Plous (1996) found psychology students to be supportive of using animals in psychological research but stressed that regulations should be strengthened. Thus, it might be interesting to investigate whether people's views on animal use are related to their confidence in those involved. For example, are people's views on using animals for research influenced by their confidence in the scientists who conduct this research, and the government who regulate such practices?

### **Attitudes toward animal use and social psychology theory**

The present study examined perceptions and beliefs to understand attitudes toward animal use. Previous studies in this area have focused mostly on personal characteristics such as gender, personality, religious orientation, and so on. These have indicated a consistent, significant, but fairly weak relationship between attitudes and such characteristics, with

the latter accounting for around 5-10% of the variance in people's views. In contrast, the psychological factors examined in the present study could account for up to 62%. This indicates that those wishing to better understand attitudes toward animal use would be best advised to further examine such psychological factors. Such a path could fit within a Theory of Planned Behaviour (TPB) framework. The TPB focuses mainly on the determinants of behaviour, one of which is attitudes, ascertaining that attitudes are determined by underlying beliefs (Ajzen, 1991). The present study provides evidence to indicate that psychological factors are strong predictors of attitudes.

Psychological processes that allow us to explain and justify seemingly contradictory opinions or actions relate to cognitive dissonance theory (see Festinger, 1957). This theory describes how a perceived discrepancy between beliefs, attitudes, and action cause people to experience psychological discomfort or tension. In order to eliminate these uncomfortable feelings, a shift in psychological processing occurs so that there is no longer an incongruence between a person's view and actions. That is, rather than a person forming an attitude and behaving in a way that reflects that attitude, they are more likely to assume views and beliefs that are congruent with, and therefore can be used to explain and justify, their actions. For example, a person who is fond of animals but chooses a career in pharmaceutical research will need to shift their views in order to justify their participation in animal research. A perception that there are no alternatives to using animals for such research may be one way of doing so, and hence this perception may become stronger or more salient to that person. This allows them to reduce dissonance that results from the incongruity between their actions that may cause harm to animals and their affection for animals. By examining the factors that underlie attitudes toward animal use we can gain insight into the process that facilitates inner accord and reduces cognitive dissonance.

Cognitive dissonance theory seems to provide a sensible explanation of why attitudes are so complex in terms of underlying factors, and why the combinations of factors and their varying degrees of importance differ in relation to views concerning different types of animal use. People will adjust their perceptions and beliefs so that they are congruent with their attitudes and actions, hence minimising dissonance between beliefs, attitudes and behaviour. The factors discussed in this research provide the tools for such, as people can use arguments (e.g., there are no alternatives to using animals) to justify support for the use of animals, even when supporting animal use is incongruent with other factors such as their affection for animals. Alternatively, another person may use the opposite argument, that there are alternatives to using animals, to justify their opposition to animal use, even although they may acknowledge the value of medical research. Different factors are needed to justify animal use, depending upon the nature of the type of animal use in question, and types of animal use associated with high costs to those animal involved will require more complex justification than those associated with low costs. So, for example, when discussing the use of animals for entertainment, that animals do not appear to suffer may be used as a straightforward reason to justify a visit to the zoo, whilst a medical student involved in animal uses associated with high costs may defend invasive animal research by stressing that there are no alternatives to using animals, that the benefits outweigh the costs, and that humans needs are more important than the needs of animals. Therefore, psychological processing of information will differ for different types of animal use, and different people can reach opposing conclusions when considering the acceptability of the ways in which animals are used.

## **Conclusions**

People's views on how animals are used are clearly complex. The present study found a strong relationship between attitudes toward animal use and psychological factors; these perceptions and beliefs have been neglected

by previous research in this field. Combinations of factors varied depending upon the type of animal use in question, which may explain why levels of support differs across different types of animal use and provides strong empirical evidence that such attitudes are not uni-dimensional. We recommend that future research focus on psychological factors identified as important in the present study, in order to understand people's views on the subject of animal use. The present research adds to our knowledge of people's views about the use of animals, demonstrating that perceptions and beliefs can account for people's attitudes toward animal use better than other personal characteristics that have been the focus of previous research in this area.

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Study 4: Attitudes toward the use of animals for medical research and dissection:  
Can we change their minds?

## **CHAPTER 5**

### **STUDY 4: ATTITUDES TOWARD THE USE OF ANIMALS FOR MEDICAL RESEARCH AND DISSECTION: CAN WE CHANGE THEIR MINDS?**

#### **AIMS:**

1. To develop a technique that can be used to manipulate perceptions of choice.
2. To assess the effectiveness of this technique.
3. To measure the effect of manipulating perceptions of choice on attitudes toward the use of animals.



**ABSTRACT**

People's perceptions concerning whether there are alternatives to using animals ("perceptions of choice") are related to their attitudes toward animal use. The present research aims to establish whether this relationship is causal. A questionnaire measuring perceptions of choice and attitudes toward different types of animal use was completed by 120 participants. Preceding this, one group of participants ( $n = 28$ ) read material aimed at persuading them that there are alternatives to using animals for medical research, whilst another group ( $n = 24$ ) read material aimed at persuading them that there were no such alternatives. Two more groups were provided similar information regarding the use of animals for dissection, aimed at persuading participants either that there are alternatives ( $n = 21$ ) or that there are not ( $n = 27$ ). A control group ( $n = 20$ ) completed the questionnaire without being provided with any such information. The group that were informed that there are alternatives to using animals for medical research presented significantly lower levels of support for the use of animals for medical research than did other groups. Other manipulations did not show a similar effect. It was proposed that there is a causal relationship between perceptions of choice and attitudes toward animal use, and that, in some contexts at least, it can be relatively easy to manipulate such perceptions in order to cause a shift in people's views.

## INTRODUCTION

Previous research demonstrated a relationship between attitudes toward animal use and psychological factors such as perceptions and beliefs concerning animals and animal use (see previous studies in this thesis). But evidence for a causal relationship between attitudes and these psychological factors is yet to be established. The present study focused on people's perceptions concerning whether there are alternatives to using animals ("perceptions of choice") in relation to attitudes toward the use of animals for medical research and dissection for teaching purposes. Perceptions of choice was chosen since it was found to be the strongest predictor of attitudes toward such practices (see Study 3 of this thesis). Reading materials that aimed at manipulating perceptions of choice were developed, since provision of information can be effective in changing people's views concerning animals and animal use (e.g., see Hills & Lalich, 1998; Opatow, 1993; Rajewski, Rasmussen, & Craft, 1993). Different material was read by different groups of participants. Perceptions of choice and attitudes toward using animals for medical research and dissection were then measured, in order to determine whether there is a causal relationship between the two. It was predicted that participants who were informed that there were alternatives to using animals for medical research would be less supportive of using animals for medical research, compared to compared to participants who were informed that there were no alternatives and participants who were given no information concerning alternatives to animal use (Hypothesis 1). It was also predicted that participants who were told there were alternatives to using animals for dissection, would be less supportive of using animals for dissection, compared to participants who were told that there were no alternatives and participants who were given no information concerning alternatives to animal use (Hypothesis 2). Support for these hypotheses in terms of between-groups differences in attitudes, would provide evidence for a causal relationship between perceptions of choice and attitudes toward animal use.

## **METHOD**

### **Participants**

Data collection was conducted on University of Portsmouth premises, therefore most participants were students. Posters advertised the study as a psychological study, and invited students to take part. Researchers waited in the entrance of the Student Union and students willing to participate sat at a table and completed the questionnaire (in return for a small incentive each). Over a period of two days, a convenience sample of 120 participants was obtained. The mean age of participants was 24.42 years ( $SD = 9.17$ ), with 42.5% male, and 57.5% female.

### **Manipulating perception of choice: The questionnaire introductions**

The present study included four different types of manipulation, plus a 'no manipulation' control. The four manipulations (referring to either medical research or dissection) attempted to persuade the participant that either there are alternatives to using animals (i.e., 'high choice'), or that there are not alternatives to using animals (i.e., 'low choice'). Both could be considered statements of truth, since scientists cannot agree on whether there are reliable and valid alternatives to using animals for medical research and dissection (for opposing views on this subject see Baldwin, 1993; Miller, 1985; Bowd & Shapiro, 1993). The manipulations emphasised either that science has found alternatives to using animals (high choice) or that science has not found alternatives to using animals (low choice) (see Appendix VI for actual information provided to participants).

A pilot study confirmed that participants could easily understand all four versions of the introduction.

### **The questionnaire**

The questionnaire used in the present study was described and used in Study 3 of this thesis (see Appendix V). Whilst this included a general

measure of “perceptions of choice”, a third section was added that comprised statements representing a further, more specific measure of “perceptions of choice”. This measured perceived alternatives relating to using animals for medical research and using animals for dissection for teaching purposes. There were four statements, two for each of these two kinds of animal use. The statements that measured perceptions of choice relating to using animals for medical research were: (i) ‘We have to use animals for medical research because there isn’t anything else we could use for this purpose’; and (ii) ‘The benefits to humans are so great that we have no choice but to use animals in medical research’. The statements that measured perceptions of choice relating to using animals for dissection purposes were: (i) ‘We have to use animals when teaching people about biology because there isn’t anything else we could use for this purpose’; and (ii) ‘The benefits to humans are so great that we have no choice but to use dead animals to teach biology’. Each of these statements were followed by a 7-point Likert scale (from ‘disagree strongly’ to ‘strongly agree’).

### **Manipulation checks**

Examined were three measures that would show if attempts to manipulate perceptions of choice had been successful, these being a measure of general perceptions of choice (i.e., statements that referred to whether there were alternatives to animal use *in general*), and statements that referred to alternatives to using animals *specifically in medical research*, and statements that referred to alternatives to using animals *specifically for dissection*.

Separate oneway ANOVAs compared each manipulation group with the control group on the same measures. Table 5.1 presents mean scores and standard deviations for all perceptions of choice measures across manipulation types.

**Table 5.1. Perceptions of choice across manipulation types**

	Research (high choice)	Research (low choice)	Dissection (high choice)	Dissection (low choice)	Control
POC medical research	3.29 SD= 1.54	4.32 SD= 2.11	-	-	4.22 SD= 1.97
POC dissection	-	-	4.19 SD= 1.44	3.68 SD= 1.98	4.10 SD= 1.42
General POC	2.76 SD= 1.40	4.15 SD= 1.94	3.33 SD= 1.55	3.89 (SD= 1.67)	3.90 SD= 1.73

NOTE: Low POC scores represent belief that alternatives do exist.

### **Perceptions of choice relating to specifically medical research**

When the high and low choice medical research conditions were compared, a significant effect was found ( $F(1,50) = 3.39, p < .05$ ).

When comparing all three groups on perceptions of choice *specifically relating to medical research*, no significant differences were found ( $F(2,69) = 2.12, p > .05$ ). Nor were differences found when comparing the control group to the high choice medical research condition ( $F(1,43) = 2.53, p > .05$ ), or when comparing the control group to the low choice medical research condition ( $F(1,47) = .14, p > .05$ ).

### **Medical research manipulations: General measures of perceptions of choice**

When all three groups were compared, a significant effect was found for general perceptions of choice scores ( $F(2,69) = 4.62, p < .05$ ). Compared to the control group, participants who were told that alternatives did exist (the high choice medical research condition) believed this to be so. That is, significantly lower general perceptions of choice scores were revealed ( $F(1,43) = 5.84, p < .05$ ). When comparing the high choice medical research condition to the low choice medical research condition, a significant effect was also found ( $F(1,50) = 8.53, p < .01$ ). However, when

the control group was compared to the low choice medical research condition scores did not differ ( $F(1,47) = .21, p > .05$ ).

These findings indicate that perceptions of choice was successfully manipulated when participants were told that there are alternatives to using animals for medical research (the high choice medical research condition). However, informing participants that there are no alternatives did not have an impact on perceptions of choice scores.

### **Perceptions of choice relating to dissection**

When all three groups were compared on their scores *specifically relating to dissection*, no significant effects were revealed ( $F(2,65) = .63, p > .05$ ).

Similarly, effects were non-significant for comparisons between the control group and the high choice dissection condition ( $F(1,40) = .04, p > .05$ ), the control group and the low choice dissection condition ( $F(1,46) = .64, p > .05$ ), and the high choice dissection condition and the low choice dissection condition ( $F(1,46) = .97, p > .05$ ).

### **Dissection manipulations: General measures of perceptions of choice**

When all three groups were compared on scores for general perceptions of choice, a non significant effect was found ( $F(2,65) = .75, p > .05$ ).

Further, no significant differences were found for this measure when comparing the control group with the high choice dissection condition ( $F(1,40) = 1.22, p > .05$ ), when comparing the control group with the low choice dissection condition ( $F(1,46) = 1.04, p > .05$ ), and when comparing the high choice dissection condition with the low choice dissection condition ( $F(1,46) = .02, p > .05$ ).

The above analyses indicate that the dissection manipulations were unsuccessful.

RESULTS

Perceptions of choice and attitudes toward animal use

ANOVAs were conducted in order to examine whether manipulating perceptions of choice had a causal influence on attitudes toward animal use. Mean scores can be seen in Table 5.2.

Table 5.2. Attitudes toward animal use across manipulation types

	Research (high choice)	Research (low choice)	Dissection (high choice)	Dissection (low choice)	Control
Attitudes toward research	2.76 SD= 1.61	3.70 SD= 2.02	-	-	3.66 SD= 1.67
Attitudes toward dissection	-	-	3.85 SD= 2.01	3.46 SD= 1.91	3.99 SD=1.56

Attitudes toward using animals for medical research

In order to examine whether the medical research manipulations had influenced attitudes toward animal use, ANOVAs were conducted in order to compare each manipulation condition to the control group. As shown in the previous section, only the high choice medical research condition appeared to have an impact on measurements of perceptions of choice, and it was anticipated likely that only this manipulation would have a significant effect on attitudes.

Results revealed that support for using animals for medical research was significantly lower for those participants in the high choice medical research condition compared to the control group ( $F(1,43) = 4.47, p < .05$ ). No significant difference was found for support for using animals for medical research when the low choice medical research condition was compared to the control group ( $F(1,47) = .11, p > .05$ ). Further analyses comparing the high choice medical research condition to the low choice

medical research condition for attitudes also confirmed a significant effect ( $F(1,50) = 3.39, p < .05$ ).

In other words, when participants were told that there are alternatives to using animals for medical research, their support for using animals for such purposes was reduced. This indicates a causal relationship between perceptions of choice and attitudes toward the use of animals for medical research. However, telling participants that there are no alternatives to using animals did not appear to influence attitudes toward animal use. Hence Hypothesis 1 was partially supported.

### **Attitudes toward using animals for dissection**

Support for using animals for dissection did not differ for those participants who were told that there are alternatives compared to the control group, ( $F(1,40) = .01, p > .05$ ) (Hypothesis 2 was rejected), nor did it differ for those told that there are no alternatives ( $F(1,46) = .72, p > .05$ ).

Furthermore, when the high choice dissection condition and the low choice dissection condition were compared on scores for attitudes toward dissection, a non significant effect was found ( $F(1,46) = .49, p > .05$ ). That is, the dissection manipulations did not influence attitudes toward the use for animals for dissection. Hence Hypothesis 2 was rejected.

In summary, the high choice medical research manipulation led to lower levels of support for medical research, whilst other manipulations did not yield significant effects.

### **Attitudes toward different types of animal use**

Since stronger attitudes might be more resistant to manipulation, comparisons were made between the mean scores representing attitudes toward the use of animals for medical research and dissection. A paired-samples t-test was conducted and participants were found to be significantly more supportive of using animals for dissection ( $M = 3.86, SD =$



1.86) than for medical research ( $M = 3.49$ ,  $SD = 1.85$ ) ( $t(119) = -2.76$ ,  $p < .01$ ).

## DISCUSSION

There is a causal relationship between perceptions of choice and attitudes toward animal use. The present research found that manipulating perceptions of choice, by informing participants that there are alternatives to using animals, led to lower levels of support for using animals for medical research.

People have pre-conceived ideas about whether we, as humans, have a choice in terms of using animals, and this can be used to justify or to condemn animal use. When choices are perceived to exist, people are less likely to support the use of animals. This provides a sensible explanation for why people are consistently more supportive of the use of animals for research and dissection, compared to other types of animal use. Cognitive dissonance theory explains how people will change their beliefs or attitudes to reduce or eliminate the discomfort experienced as a result of these being incongruent with each other. If a person believes that there are no alternatives to using animals for medical research, then they can comfortably support such research. However, if they are persuaded to believe that there are alternatives to using animals, then there will be an obvious incongruence between their perceptions of choice and attitudes, and their views on animal research will have to be adjusted. This is demonstrated in the present research, where a shift in perceptions of choice has led to a shift in attitudes toward animal use.

That one manipulation was effective in the present study indicates that the other three manipulations may need developing further. On the other hand, it may be that people *usually* believe that there are no alternatives to

medical research. This is why those presented with the research (low choice) manipulation did not differ from the control group (because they already believed this to be true, therefore their views didn't change), whilst participants in the high choice research condition were influenced by the manipulation (which is why they were less supportive of using animals for research).

In terms of people's views and perceptions concerning dissection, neither of the dissection manipulations were effective, indicating that people's views on this topic may be harder to manipulate. This may be because people are more supportive of using animals for dissection compared to for medical research (as shown in Study 3 of this thesis), that is, stronger attitudes may be more difficult to manipulate. Or it may be that people were not convinced that computer simulations and observing real-life surgery are viable alternatives to hands-on practice.

The present study included students who are likely to have few pre-conceived views about alternatives to using animals and are fairly neutral toward the topic of animal use. Therefore they will be more easily persuaded than persons who have a knowledge of alternatives to using animals. Cognitive dissonance will also ensure that people involved with animal use issues will remain steadfast in terms of the perceptions and beliefs that allow them to justify their attitudes and actions. Hence, manipulating perceptions of choice in persons with strong opinions concerning animal use is likely to prove even more difficult. This may be one reason why opposing groups remain polarised in their opinions, even when they have a fair understanding of their opponent's arguments. That is, if scientists tend to justify animal use by rejecting the notion of there being alternatives to using animals, whilst opponents of animal use do the opposite, then perceptions of choice will be resistant to change and the views of both groups are unlikely to shift.

### **Directions for future research**

In order to understand further the relationship between perceptions of choice and attitudes toward animal use, future research needs to explore alternative ways of manipulating the former, and to examine the effectiveness of doing so with different groups of people. This will aid our understanding of why people hold certain attitudes toward animal use, and whether people's views can be changed. Underlying factors such as perceptions of choice may be particularly resistant to manipulation in people such as animal welfare workers and animal researchers who are involved with animal use issues. Research also needs to examine whether change in perceptions and attitudes are long lasting and stable over time. Furthermore, it would be interesting to investigate whether perceptions of choice can be easily manipulated in children, and if so, what the effects of this might be.

Future research needs to examine further the possibility of manipulating other factors that underlie attitudes toward animal use. For example, "humans as superior" is also an important underlying factor, hence this deserves further consideration (see Study 3 of this thesis). This factor may be different to factors such as perceptions of choice because it represents a more overarching value concerning the significance of animals in relation to humans. Hence research may need to examine where animals fit within people's value systems, as values can have more impact on our attitudes than do perceptions and beliefs (Rockeach, 1973, 1991).

### **Conclusions**

People's views on how animals ought to be used are clearly complex. The present research found a strong relationship between attitudes toward animal use and perceptions of choice in relation to attitudes toward using animals for medical research. If we want to understand how attitudes toward animal use can vary dramatically between and within individuals, we need to have a greater understanding of the factors that underlie such

Study 4: Attitudes toward the use of animals for medical research and dissection:

Can we change their minds?

attitudes. This research indicates that focusing on psychological factors is a valuable approach to take.

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## **CHAPTER 6**

### **STUDY 5:**

#### **FACTORS UNDERLYING ATTITUDES TOWARDS ANIMAL USE: A STUDY OF SCIENTISTS AND ANIMAL WELFARE PERSONS**

##### **AIMS:**

1. To compare attitudes toward different types of animal use with a sample that comprises scientists involved with animal use issues, animal welfare persons, and a control group of laypersons.
2. To examine between-groups differences on the factors that underlie attitudes toward animal use.
3. To examine between-groups differences on belief in animal mind for different types of animals.

**ABSTRACT**

Scientists have been portrayed as having an uncaring attitude toward the use of animals and mostly inclined to reject the possibility of animal mind (Baldwin, 1993; Blumberg & Wasserman, 1995). The present study included scientists, animal welfare groups, and a control group (N=372), using a questionnaire to examine their attitudes toward five types of animal use, and factors that might underlie these views (including belief in animal mind for thirteen species of animal). Scientists were found to be more supportive of using animals compared to the animal welfare group, and differences were explained in terms of the underlying factors examined. However, whilst scientists supported the use of animals for medical research, they were either neutral or opposed to all other kinds of animal use; hence they were not generally in favour of animal use. Furthermore, scientists believed most of the thirteen species to have at least a moderate capacity for cognition and sentience. There was no pattern between the views of the control group, in relation to scientists and animal welfare groups, indicating that the opinions of neither of these latter two groups better represent those of the laypersons. We suggest that the negative image of scientists often portrayed by the media and in the literature of their opponents was not supported by our data, and that both scientists and animal welfare groups need to acknowledge that their views are sometimes more extreme compared to those who are less involved with animal use issues.

## INTRODUCTION

Keeping pets for companionship, hunting animals for sport, and dissection in the classroom, are all examples of 'animal use', the term that describes a range of activities involving the use of non-human animals by human beings. The practice of animal use represents a challenging and uncomfortable dilemma; animal use procedures can lead to high value benefits such as the advancement of medical knowledge, yet often cause pain, discomfort, and death to a large number of animals that we might feel affection for. Faced with this 'moral paradox', people can hold polarised and conflicting views on the subject of animal use, and those involved in such practices may need to construct elaborate justifications for their actions (Herzog, 2001).

Previous studies have explored the attitudes and beliefs of mainly students and laypersons concerning the use of animals by human beings (Driscoll, 1992; Knight, Nunkoosing, Vrij, & Cherryman, 2003; Knight, Vrij, Cherryman, & Nunkoosing, 2004; Wells & Hepper, 1997). A few studies have also examined the views of animal rights activists (e.g., Block, 2003; Herzog, 1993; Jerolmack, 2003; Plous, 1991; 1998; Shapiro, 1994). However, with few exceptions (Arluke, 1988; Paul, 2002), little is known about the attitudes and beliefs of scientists involved with animal research (Herzog & Galvin, 1997; Paul, 2002; Rollin, 1989). The present research compared a 'scientist' group (i.e., members of the Research Defence Society, the Biosciences Federation, and the Medical Research Council), an 'animal welfare' group (i.e., members of the Vegan Society and Compassion in World Farming), and a control group of persons less likely to be involved with animal use issues, in terms of their attitudes toward different types of animal use and factors that might underlie these views. The aims were to paint a rounded picture that gives a voice to different perspectives on animal use issues, and to identify whether the attitudes of



the control group were more similar to those of scientists, opponents of animal use, or neither.

Research has shown that individuals construct their own reality, and that social influence is pervasive (Billig, 1991; Pratkanis, 1989; Smith & Mackie, 1995). People's views toward a topic are influenced by their social world (i.e., external factors) and how they interpret this world (i.e., internal factors). Such factors are intertwined so that cognitions and emotions affect our social interactions, whilst our personal relationships and perceived social norms affect how we process information and form attitudes (Ajzen & Fishbein, 1980; Chaiken, Liberman, & Eagly, 1989; Fishbein & Ajzen, 1975; Petty & Cacioppo, 1981). The present research examined attitudes toward animal use in relation to factors that might underlie these views, these being group membership (i.e., an external factor), and psychological processes (i.e., internal factors). The latter comprised perceptions of alternatives to using animals, belief in the mental capacities of animals, and the belief that humans are superior to animals. It was anticipated that the 'scientist' group and the 'animal welfare' group would hold opposing attitudes toward animal use, and that such differences might be explained in terms of these external and internal factors.

### **Group membership and attitudes toward animal use**

Group membership is an external factor that influences internal processes in terms of how we perceive ourselves in relation to others. Being part of a group can act as a frame and a filter through which we perceive the world and can thus have a profound influence on our perceptions and beliefs. We interact with like-minded others where a mutual sharing of similar ideas and perspectives as others agree with how we see the world (Smith & Mackie, 1995). This process can lead to group polarisation, the term that describes how the average viewpoint of a group shifts to a more extreme position following group interaction (Moscovici & Zavalloni, 1969), and

may apply to both of the opposing groups in the present study. Another consequence of group membership is that 'in-group – out-group bias' can occur, especially if group members are faced with the views of an opposing group (Brewer, 1979; Lee & Ottati, 2002; Tajfel, 1981). This means that one's own group (i.e., the in-group) are perceived more favourably than the out-group, even when there is little reason for doing so, and especially if the out-group is perceived to be a threat to the in-group (Billig & Tajfel, 1973).

Involvement with an issue that has personal relevance to a person can also lead to more extreme attitudes toward that issue (Liberman & Chaiken, 1996; Petty & Cacioppo, 1984). Personal relevance is an important component of attitudes, and implicit in social judgement theory (Liberman & Chaiken, 1996). If an issue such as the use of animals for medical research is of personal relevance to a person (for example, that person has benefited from research practiced on animals), then this can result in more polarised attitudes toward the issue. One explanation for this is because personal relevance can influence how judgements are made. That is, social judgements (in this case attitudes) can be either 'systematic' in that they entail careful consideration of available and relevant information that lead to rational judgements based on the evidence, or 'heuristic' in that they are based on simple decision rules that do not require much thought or effort. Such processes are on a continuum from mindless to mindful consideration (Chaiken, 1980; Sorentino, Bobocel, Gitta, Olson, & Hewitt, 1988). High personal relevance through involvement with an attitude object leads to systematic processing of information and mindful consideration of the issue. All of these can result in more extreme views toward the attitude object (Liberman & Chaiken, 1996). Thus, since attitude formation is a process, systematic processing due to involvement with medical research may lead to more extreme views (i.e., support for such research).

In the present study participants in the 'scientist' group and the 'animal welfare' group were members of organisations relating to animal use, and therefore their views were likely to be influenced by group membership. It was expected that these two groups would hold extreme views toward the subject of using animals for medical research and dissection, with the 'scientists' showing strong support for these, and the latter showing strong opposition to such. Furthermore, since laypersons would not be influenced by group membership nor personal relevance, it was expected that, compared to these two opposing groups, their attitudes would be more neutral. Hence, Hypothesis 1 predicted that the 'scientist' group would be significantly more supportive of using animals for medical research and dissection compared to the 'animal welfare' group and the control group. Also examined was whether groups would differ on their attitudes toward other types of animal use, and it was anticipated that the control group and the 'scientist' group would hold similar views toward the other types of animal use examined. Group membership should only influence the 'scientists' in terms of their views on using animals for medical research and dissection). However, Hypothesis 2 predicted that the 'animal welfare' group would be less supportive of all types of animal use compared to the 'scientist' group and the control group (because the 'animal welfare' group are against animal use in general).

Group membership often leads to members collecting one-sided information in order to support their view and reflect the perspective of the group to which they belong to (Smith & Mackie, 1995). In terms of the debate over animal use, fundamental arguments over the issue of animal use have changed little over time, with scientists and researchers tending to focus on the benefits of their work and lack of alternatives, whilst opponents of animal use tend to focus on the plight of the animals involved (Baldwin, 1993; Dewsbury, 1990; Miller, 1985; Paul, 2002). Furthermore, many scientists describe animals as qualitatively different from humans, and propose that humans have dominion over animals

(reflecting Judeo-Christian beliefs). Animal activists believe that animals should have equal rights to humans and therefore should not be used for the benefit of human beings (Baldwin, 1993; Herzog, 1990). Thus, scientists and their opponents are said to be 'engaged in an ideological and political struggle over the use of nonhuman animals in research' (Dewsbury, 1990, p.315), described by Gluck and Kubacki (1991) as a 'state of war'. Those involved with animal research may face hostility from the public, the media, and students (Feeney, 1987), whilst animal rights supporters are often portrayed as lacking in concern for human beings and as holding skewed value systems (Yanoff, 1997). Despite a history of open debate on this topic, there is no society-wide consensus on animal use issues, and public opinion remains very much divided (Herzog, Rowan, & Kossow, 2001).

### **Psychological processes and attitudes toward animal use**

Most previous research tends to focus on personal characteristics (such as gender, age, and experience of animals) to explain variance in attitudes toward animal use (e.g., Furnham & Pinder, 1990; Plous 1996; Wells & Hepper, 1997). However more recently a series of studies with laypersons examining factors that underlie attitudes toward animal use (Knight, et al., 2004; Knight, et al., 2003; and Study 3 of this thesis) have identified three factors that may be more relevant than personal characteristics, these being: (i) perceived alternatives to using animals ('perceptions of choice'); (ii) the belief that humans are superior to animals ('humans as superior'); and (iii) beliefs about the mental abilities of animals ('belief in animal mind'). The present study examined these factors in relation to attitudes toward the use of animals, and are discussed in detail below.

### **Perceptions of choice**

When discussing the use of animals for dissection and research, Rowan (1984) proposed that alternatives must consist of techniques that can replace the use of animals altogether, reduce the amount of animals

required, and/or reduce the amount of distress suffered by those animals involved. Fleischmann (2003) reported that over the past fifteen years a controversy has developed concerning replacing animals with dissection simulation software. That is, there is support against such replacement by those arguing that dissection is necessary to teach anatomy and physiology (Akpan & Andre, 1999; Baldwin, 1993; Valli, 2001), whilst others have found replacements to be at least comparable, and sometimes superior, to animal dissection (Balcombe, 2000; Kinzie, Strauss, & Foss, 1993; Strauss & Kinzie, 1994; Youngblut, 2001). Alternatives for animals in medical research are also being developed, for example, the use of tissue culture and the use of human volunteers. The Humane Society of the United States (HSUS) reports that few scientists would choose to use animals if alternatives were available, and many companies are now investing time and money in seeking such alternatives (HSUS, 2005). However, it is also reported that many scientists are reluctant to accept alternatives as a concept. Rather they perceive other methods as an addition to or complementary to animal research (HSUS, 2005). Whilst investments are being made to develop alternatives, the trend appears to focus on reducing animal use, rather than eliminating it, and reducing pain and distress caused to animals used for research.

In their qualitative research, Knight, et al. (2003) found that when participants were encouraged to talk about the issues they perceived to be important or relevant when considering their views about animal use, they often mentioned whether they perceived humans to have a choice in using animals (i.e. 'perceptions of choice'). That is, they considered whether there were alternatives to using animals, and if alternatives were perceived to be available (e.g., cruelty-free cosmetics, fake-fur clothing) then support for animal use was lower than if no alternatives were perceived to exist. Perceptions of choice was also found to be an important predictor of attitudes toward animal use in a later quantitative study (see Study 3 of this thesis). The present study examined perceptions of choice across

groups. Hypothesis 3 predicted that the 'animal welfare' group would have higher scores for perceptions of choice (i.e., agree more that there are alternatives to using animals) compared to the 'scientist' group (with laypersons scoring between these two groups).

### **Humans as superior to animals**

The National Science Foundation (1991, in Baldwin, 1993) found that half their participants agreed that research that causes pain and injury should be carried out on chimpanzees and dogs if it leads to new information concerning human health problems. This is a surprising finding since research usually shows people to be least supportive of using 'higher' animals such as chimpanzees and popular pets such as dogs. Thus, it seems that other factors may have more impact on attitudes toward animal use, for example people justify the use of animals for the benefit of humans with the assertion that humans are superior to animals (Knight, et al., 2003; and Study 3 of this thesis). That is, those who believe that animal use is justified because humans are more important than animals show higher levels of support for the use of animals, whilst those who do not agree with the notion of humans as superior show less support for animal use.

Paul (2002) described how those supporting and those opposing animal use both consider human interest and animal suffering when discussing their arguments for and against animal use. Paul (2002) found that, whilst these opposing groups both use similar criteria when thinking about their views, the criteria are not evenly weighted. That is, those supporting animal use consider human interest as their primary concern whilst animal suffering is a secondary consideration, whereas for those opposing animal use the opposite trend was observed. Other research has also found that the impact of animal discomfort and human needs are not always evenly weighted (Knight, et al., 2003; Staffleau, 1994). It may be that the belief in humans as superior may be related to a wider attitude orientation or world-

view (see Buss & Craik, 1986; Galvin & Herzog, 1992; Kalof, 2000; Kellert, 1980). For example, Collard (1990) found a relationship between concern for the environment and animal rights, whilst Kellert (1980) proposed a ten category typology describing a range of attitudes toward animals and the environment. Examples of Kellert's categories include 'moralistic' and 'utilitarian' perspectives that conflict in terms of the exploitation of animals by human beings. The former opposes, and the latter supports, the use of animals for human benefit. Other categories include 'dominionistic' that reflects support for the mastery and control of animals by humans as a demonstration of their superiority, and 'negativistic' and 'humanistic'. These two categories conflict in terms of affection for animals, with the former reflecting indifference and lack of concern for animals, whilst the latter reflects affection for animals. Hence, belief in humans as superior as a justification for animal use, as examined in the present study, may somewhat reflect components of Kellert's typology. Since belief in the superiority of humans can explain support for animal use (Knight, et al., 2003), Hypothesis 4 predicted that the 'scientist' group would agree more that humans are superior to animals, compared to the 'animal welfare' group (with scores of laypersons in the middle of these two groups).

### **Belief in animal mind**

Hodos and Campbell (1990, p.1) proposed that 'Throughout history, humans have had a fascination with animal cognition'. Anthropomorphism is defined as 'the attribution of human mental states (thoughts, feelings, motivations and beliefs) to nonhuman animals' (Serpell, 2003, p.83), and beliefs concerning the mental experiences of animals is referred to as 'belief in animal mind' (Hills, 1993; 1995; Herzog & Galvin, 1997; Knight, et al., 2004). Research with students and laypersons has shown that the attribution of mental states to animals is 'commonplace, cross-cultural, species typical and almost irresistible' (Eddy et al., 1993, p.88). Yet the existence of animal mind has been much debated within the scientific community. In general, it seems that scientists perceive any reference to

the possibility of animals having mental experiences as subjective and unscientific, and therefore something to be avoided (Blumberg & Wasserman, 1995). Indeed, 'counter anthropomorphism' (i.e., animals are objectified and animal mental states are denied) is common in science (Arluke, 1988), and research into the mental abilities of animals other than great apes is often considered irrelevant (Burghardt, 1985). Current writings on animal awareness avoid discussion of qualitative experience in order to avoid accusations of subjectivity (Dutton & Williams, 2004).

### **Belief in animal mind and the phylogenetic scale**

Aristotle first introduced the idea that all animals could be rated on a uni-linear, "phylogenetic scale" (otherwise known as the *scala naturae*); a hierarchical representation of the animal kingdom where complexity determines presumed historical sequence and increases over time. Animals rated higher are perceived to possess all the powers of those below it, and additional powers of their own (Aronson, 1984). Human beings situated at the top of the scale, 'higher' mammals and primates below, and the rest of the animal kingdom positioned somewhere beneath these. However, whilst the scale has been popular since its introduction, Hodos and Campbell (1969) proposed the concept that all creatures can be organised into such a hierarchical scale as inconsistent with contemporary beliefs concerning animal evolution, since modern theories of evolution assume that each species of animal has reached its respective degree of cortical development independently of any of the other species. Indeed, Lockard (1971, p.168) emphasised that 'there is no phylogenetic scale', and that 'the ancient "scala naturae" idea is pleasingly simple, but simply wrong'.

Whilst the phylogenetic scale may be an inaccurate understanding of evolution, such a perspective remains widely accepted by both laypersons and scientific researchers (Hodos & Campbell, 1969). That is, it seems that people categorise the animal kingdom (for inferred cognitive abilities



and perceived similarity to themselves) in a hierarchical fashion comparable to the *scala naturae*, with invertebrates, fish and amphibians rated near the bottom end of the scale, and mammals and primates at the top end (Eddy, Gallup, & Povinelli, 1993; Herzog & Galvin, 1997). Furthermore, research shows that people also tend to rate animals classed as pets (e.g., dogs and cats) as having higher mental abilities compared to those classed as non-pets (Eddy et al., 1993; Herzog & Galvin, 1997). Eddy et al. suggested that people make judgements on the mental capacity of animals in neither a blanket nor random fashion; rather they make such judgements with respect to context, in this case the type of animal in question and its perceived mental capacities in comparison to other species.

### **Belief in animal mind: Animal cognition and animal sentience**

When examining belief in animal mind for a range of different species, Herzog and Galvin (1997) found that there are two elements to people's beliefs, these being cognitive abilities ('animal cognition') and emotional experiences ('animal sentience'). Participants rated different species for animal cognition (consciousness, emotion, reasoning, self-awareness, and intelligence) and animal sentience (the capacity to suffer and feel pain) in a way that reflected the phylogenetic scale, in that 'lower' animals (e.g., frogs, snakes, fish) had lower scores, whereas 'higher' species (e.g., chimpanzees, dogs, cats) were consistently rated near the top of the scale. The present study compared groups on scores for belief in animal cognition and animal sentience, and it was anticipated that there would be a negative correlation between accepting that animals can experience thoughts and feelings, and supporting the use of such beings. Based on this assumption, Hypothesis 5 predicted that the 'animal welfare' group would present the highest scores for animal cognition, the 'scientist' group would present the lowest scores, whilst laypersons would score somewhere between the two. Hypothesis 6 predicted the same finding for scores representing belief in animal sentience.

The present research also examined the relationship between species of animal and belief in animal cognition and animal sentience. Such beliefs were measured concerning thirteen different species of animals, chosen to represent a range of animals in terms of their position on the phylogenetic scale and to include pet animals and farm animals (e.g., chimpanzees, sheep, cats and mice). It was predicted that examination of ratings across groups of participants would show that compared to the other groups, the 'scientist' group would hold generally lower levels of belief in animal cognition and sentience (as predicted by Hypotheses 5 & 6). However, all groups (i.e., including the 'scientist' group) would rate the thirteen different species of animals in a way that reflects the phylogenetic scale for animal cognition (Hypothesis 7) and animal sentience (Hypothesis 8). If these hypotheses were supported this would lend support to the research by Paul (2002).

### **Cognitive dissonance theory and attitudes toward animal use**

People involved in issues such as animal use may be influenced by cognitive dissonance. This term describes discomfort experienced due to a perceived discrepancy between one's attitudes and one's behaviour (Festinger, 1957; Baumeister, 1982; Smith & Mackie, 1995). When a person acts in a way that is inconsistent with their opinions, and feels uncomfortable about this inconsistency, this can cause their attitudes to shift so that they are no longer discrepant with their behaviour. Hence, if a person is fond of animals and also chooses a career in medical research that requires them to conduct research on animals, then cognitive dissonance can occur. In order for the dissonance to be reduced, the person can choose either to give up their medical career, or shift their attitudes so that animal use for medical research is perceived as acceptable to them. Since such changes require extensive cognitive processing, effects may be powerful and long lasting. Thus, the views of scientists and animal welfare people concerning animal use issues are

likely to have been strengthened further by the effects of cognitive dissonance. The aforementioned variables (perceptions of choice, humans as superior, and belief in animal mind) are likely to be influenced by cognitive dissonance theory, as these variables may lead used as justification to reduce cognitive dissonance. That is, scientists may perceive there to be less alternatives to using animals, believe humans to be superior to animals, and hold lower levels of animal mind, in order to bring their views in-line with their involvement with animal use, whilst the opposite may occur for persons involved with animal welfare.

### **Attitudes toward different types of animal use**

Whilst attitudes towards animal use are said to be uni-dimensional (Armstrong & Hutchins, 1996; Matthews & Herzog, 1997), people's views often differ depending upon the type of animal use in question. For example, people tend to be more supportive of using animals for medical research and dissection purposes compared to using animals for personal decoration and entertainment (Knight, et al., 2004; Perlo, 2003). This may be because people consider different factors when considering their views about different animal uses. For example, when thinking about using animals for research people weigh up the costs and benefits of such use, and perceive the benefits of such practices (e.g., the development of a new drug to treat a serious illness) to outweigh the costs (e.g., death caused to the animals involved in testing such a drug), and therefore support animal research (Knight, et al., 2003). However, when thinking about their views on using animal skin/ fur to make clothing, people may think of other fabrics that could be used as an alternative to animal skin/ fur, and therefore consider killing animals for clothing as unnecessary and unacceptable. The present study measured attitudes toward five different types of animal use, chosen because they are mentioned most often in the literature on this topic (Armstrong & Hutchins, 1996; Knight, et al., 2003; Matthews & Herzog, 1997). These were using animals for (i) medical research (e.g., developing new drugs), (ii) dissection for teaching

purposes (e.g., medical training), (iii) personal decoration (e.g., clothing from animal fur or cosmetics testing), (iv) entertainment (e.g., keeping animals in zoos), and (v) animal management practices (e.g., laying rat poison). Factors that underlie attitudes towards each of these were explored, and it was expected that these would differ between our three groups (see Hypotheses 3-6).

### **Attitudes toward the use of different types of animals**

Previous research has found that not only do attitudes differ for different types of animal use, they can also differ for different species of animals. For instance, people are more supportive of animal use that involves smaller-brained animals such as mice and rats, and less supportive of the use of animals classed as pets (e.g., cats and dogs), and animals believed to have 'higher' mental abilities (e.g., chimpanzees and apes) (Driscoll, 1987; Herzog & Galvin, 1997; Hills, 1995; Knight, et al., 2003; 2004). Thus there is an interaction between people's views on different types of animal use and the use of different species of animals. For example, a person may be generally supportive of using animals for research compared to using animals for entertainment, but that person's view may change depending upon the species of animal in question. So the same person may support the use of mice and rats for dissection purposes but not support the use of chimpanzees, cats and dogs for the same purpose. In order to examine the relationship between attitudes and type of animal, the present research compared attitudes towards the use of different species of animals. These were animals considered to be used most in animal experimentation in the UK (see [www.peta.org.uk](http://www.peta.org.uk)), and were chosen to represent either: (i) 'higher', larger-brained non-pet animals (i.e., chimpanzees and monkeys); (ii) 'higher', larger-brained companion animals (i.e., dogs and cats); (iii) 'lower', smaller-brained companion animals (i.e., rabbits and guinea pigs); and (iv) 'lower', smaller-brained non-companion animals (i.e., rats and mice). Hypothesis 9 predicted that

support would be highest for the use of rats/ mice and rabbits/ guinea pigs, and lower for the use of dogs/ cats and chimpanzees/ monkeys.

## METHOD

### Participants

Participants were members of organisations that were predicted to hold pro- or anti- animal use views, and a matched control group was also included. This resulted in a sample of 372 participants: 155 'scientists', 159 'animal welfare' persons, and 58 in the matched control group.

The organisations that were anticipated to be pro-animal use (for medical research) were the Research Defence Society (RDS), the Biosciences Federation (BF), and the Medical Research Council (MRC). RDS members are scientists involved with animal research, and the aim of the RDS is 'to defend animal research and promote understanding of the benefits it yields' (Paul, 2002, p.3). The BF is an umbrella organisation of bioscientists (in areas such as physiology, neuroscience, biochemistry, microbiology and ecology), involved with research which is often dependent on the use of animals. The BF Animal Science Group public statement agreed that 'there is a continued need for animal experimentation both in applied research and in research aimed at extending knowledge', and that 'toxicological testing in animals is at present essential for medical practice and the protection of consumers and the environment' (see [www.bsf.ac.uk](http://www.bsf.ac.uk)). The MRC<sup>1</sup> aims to fund and support a full range of medical research studies, and 'considers that the

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<sup>1</sup> Whilst the MRC does support the use of animals in medical research, it reports that only 30% of the projects and programmes that it supports involves the use of vertebrate animals. The MRC sets high ethical standards, and in 2001 set up the Centre for Best Practice for Animals in Research (for more information, see [www.mrc.ac.uk](http://www.mrc.ac.uk)).

Study 5: Factors underlying attitudes towards animal use: a study of scientists and animal welfare persons

use of animals in scientific procedures will remain an essential part of medical research for the foreseeable future' ([www.mrc.ac.uk](http://www.mrc.ac.uk), p.1).

To represent the 'animal welfare' group in the present study, Compassion in World Farming (CIWF) and the Vegan Society (VS) were contacted, both of which agreed to take part. Compassion in World Farming aims to end factory farming systems 'and all other practices, technologies and trades which impose suffering on farm animals' (see [www.ciwf.org.uk/about/beginning.html](http://www.ciwf.org.uk/about/beginning.html)). The Vegan Society promotes a lifestyle that seeks to exclude, as far as is possible and practical, all forms of exploitation of animals for food, clothing or any other purpose ([www.vegansociety.com](http://www.vegansociety.com)).

When all data had been collected from the above organisations, participant characteristics were examined to enable the control group to be matched. Data related to gender, education, age, and living area (rural-urban) whilst growing up and at present (see Table 6.1).

Table 6.1. Comparing personal characteristics across organisations

		Scientist (N=155)	Animal welfare (N=159)	Control (N=58)
Gender (%)	Male	66.45	22.90	25.90
	Female	33.55	77.10	74.10
Education	GCSE/ O' Level	3.40	30.80	2.59
	A'Level	7.70	8.50	24.10
	Degree	87.70	56.70	72.90
	None	.50	3.80	0.41
Age (Mean)	Age	50.60	45.94	42.80
Living location:	Past	4.24	4.01	4.45
Urban-rural (Mean)	Present	4.12	4.19	4.03

Education level was clearly skewed in that more participants in the 'scientist' group reported high (i.e., to at least degree level) education levels, compared to the 'animal welfare' organisations. Consequently it was decided that we would aim for a control group that represented this distribution (i.e., that approximately 70-75% of the control group would be educated to degree level). Therefore many university staff (at the University of Portsmouth, United Kingdom) were invited to participate, together with laypersons.

Chi-square analyses were used to compare gender and education across groups, whilst ANOVA's were conducted to compare age and location in which participants lived (whilst growing up and at present). Significant between-groups differences were found for gender ( $\chi^2$  (2,  $n = 372$ ) = 82.01,  $p < .001$ ), education ( $\chi^2$  (2,  $n = 372$ ) = 170,  $p < .001$ ), and age ( $F$  (2,369) = 18.76,  $p < .001$ ), but not for living area, in the past ( $F$  (2,371) = 1.622,  $p > .05$ ), and at present ( $F$  (2,371) = 0.156,  $p > 0.05$ ). Thus, gender, education and age were included as co-variables in later analyses.

## Design

A questionnaire (see Appendix VII) was used to collect data on participant characteristics, followed by three sections. The first section measured attitudes toward different types of animal use (medical research, dissection, personal decoration, entertainment, and animal management), and the belief that humans are superior to animals ('humans as superior'). The second section measured belief in animal mind (animal cognition and animal sentience for thirteen species of animals). The third section measured 'perceptions of choice' (for medical research, dissection, personal decoration, entertainment, and animal management). These measures were the dependent variables ( $N=13$ ).

There were four types of questionnaire that differed in terms of section one, in that each type of questionnaire measured attitudes toward animal

use, and humans as superior, in relation to either: (i) monkeys / chimpanzees; (ii) dogs / cats; (iii) rats / mice; or (iv) rabbits / guinea pigs. Hence, 'type of animal questionnaire' was a between-groups measure. The sample was divided into three groups of participants, a 'scientist' group, an 'animal welfare' group, and a control group. 'Type of animal questionnaire' (N=4) and group of participants (N=3) were the independent variables. Relationships between dependent variables (N=13) and independent variables (N=12) were explored in order to test the aforementioned hypotheses.

### **Participant characteristics**

The first part of the questionnaire collected some general data on participants. These questions were originally developed and used by Knight, et al. (2003; 2004) (based on statements first designed by Armstrong & Hutchins, 1996; and Matthews & Herzog, 1997). Details on gender, age, education, pet ownership, and living location were collected, since these variables have been found previously to relate to attitudes toward animal use. These were examined in order to screen the sample for skewness, and also to identify a matched control group.

### **Section One: Attitudes toward animal use and humans as superior**

Section one consisted of fifty statements designed previously by Armstrong and Hutchins (1996) and Matthews and Herzog (1997) (see Study 1). These statements measured attitudes toward the use of animals for medical research, dissection, entertainment, personal decoration and animal management practices, and also measured belief in humans as superior to animals. These statements were developed further, by adjusting the wording of statements to measure attitudes towards the use of four different groups of animals (i.e., monkeys /chimpanzees, dogs/cats, rabbits/guinea pigs, rats/mice). These were identified as groups of animals involved in animal experimentation in the UK (based on information from the People for Ethical Treatment of Animals (PETA) website- see



[www.peta.org.uk](http://www.peta.org.uk)). All statements were responded to using a 7-point Likert scale (from strongly agree to strongly disagree), were later coded so that higher scores represented more support for animal use and the belief that humans are superior to animals, and were re-categorised into six clusters to represent attitudes towards each of the five types of animal use and 'humans as superior'.

## **Section Two: Belief in animal mind**

This section was designed and used by Herzog and Galvin (1997), and comprised eight questions measuring two elements of belief in animal mind (animal cognition and animal sentience). Each question was asked for thirteen species of animal (pigs, rabbits, sheep, fish, cats, birds, monkeys, cows, guinea pigs, rats, mice, dogs, and chimpanzees). This resulted in a total of 104 questions. Each question (for each species of animal) was followed by a 6-point Likert scale (that included a 'don't know' option), the wording of which changing slightly depending on the question. For example, the question 'In your opinion, typically, how intelligent do you think each of the following species is?' was followed by a scale of 1-5, with '1' representing 'possess no intelligence' and '5' representing 'possess humanlike intelligence', whilst 'In your opinion, typically, to what extent do animals feel emotions such as joy, anger, and sadness?', was followed by a scale where '1' represented 'no capacity for feeling emotions' whilst '5' represented humanlike capacity for feeling emotions'.

**NOTE:** a score of '6' always represented a 'don't know' option- see information later with regards to how the 'don't know' option was dealt with.

Examination of responses to the 104 questions showed that 5.06% of responses (N= 1976) were 'don't know' responses. These were participant-specific, in that particular participants seemed to respond with 'don't know' to a number of questions, rather than certain questions

eliciting this response. Since the percentage of such scores was low, and therefore unlikely to have a significant impact on overall scores, it was decided that all 'don't know' scores of '6' would be recoded and replaced with the overall mean score of the whole sample for that variable.

Next, belief in animal mind items were coded into the two clusters as recommended by Herzog and Galvin (1997). The first were proposed to represent belief in animal cognition (capacity to reason, self-awareness, emotions, consciousness, and intelligence), the second were proposed to represent belief in animal sentience (capacity to suffer, experience pain, and moral consideration deserved). Cronbach's alpha was calculated to determine the internal reliability of these clusters, and reliability was found to be high (with scores of .98 and .95, respectively). In addition, all items measuring cognition and sentience were also re-coded to represent overall scores for each species of animal. Thus, all items representing belief in cognition for pigs were categorised as one cluster, all items representing belief in sentience for pigs were categorised as another cluster, all items representing belief in cognition for sheep were categorised as another cluster, and so on, for each of the thirteen species of animal.

### **Section Three: Perceptions of choice**

Statements measuring perceptions of choice were designed specifically for this study, based on findings from Knight et al. (2003). There were ten statements measuring this factor, two statements for each of the five types of animal use. For example, 'We have to use animals for medical research because there isn't anything else we could use for this purpose', together with 'The benefits to humans are so great that we have no choice but to use animals in medical research', measured perceptions of choice relating to using animals for medical research, whilst 'We have to use animals when teaching people about biology because there isn't anything else we could use for this purpose', together with 'The benefits to humans are so

great that we have no choice but to use dead animals to teach biology', measured perceptions of choice relating to using animals for dissection purposes. These statements measuring 'perceptions of choice' were each followed by a 7-point Likert scale (from 'disagree strongly' to 'agree strongly').

Perceptions of choice items for each type of use were categorised into one cluster for each of the five types of animal use, and these responses were coded so that a high score represented the perception that there are alternatives to using animals.

### **Revising the questionnaire**

The questionnaire used in the present study was based on that used in previous research (Knight et al., 2003). Feedback from this study indicated two general problems with the questionnaire, and therefore the original questionnaire was modified before it was used in the present research.

The first problem identified in previous research was that participants commented that their views depended upon the type of animal in question (Knight et al., 2003; 2004). The original questionnaire asked about people's views towards animals in general, rather than asking about their attitudes towards the use of particular species of animals. This is why the present study included 'type of animal questionnaire' as a between-subjects factor, as described earlier.

The second problem was that minor changes were needed in terms of the wording of some of the statements, outlined as follows.

NOTE: In the revised statements shown below, one of the animal groups mentioned previously replaced the word '**animals**' (in bold).

'There are humane ways to kill research animals'. This was seen to measure a belief, not an attitudes toward research, therefore the statement was changed to 'I agree with medical research because research animals are killed humanely'.

'Saving costs in animal experimentation justifies maintaining animals in overcrowded and often painful conditions'. This statement was seen to be over-biased by several of the participants (in Knight et al., 2003) and so was changed to 'Saving costs in animal experimentation justifies maintaining research animals in uncomfortable conditions'.

'Experimentation with research animals is cruel, even if it saves human lives'. This statement was changed to 'I agree with experimentation with animals that is cruel, because it saves lives' (because the former didn't measure an attitude towards experimentation- a person may agree this is true but still support experimentation).

'Continued research with animals will be necessary if we are to ever conquer diseases such as cancer, heart disease and AIDS'. This statement measures a belief, not an attitude since a person may believe this to be true but not agree with using animals for research, therefore the statement was changed to 'I agree with research on animals in order to conquer diseases such as cancer, heart disease and AIDS'.

## **Procedure**

A number of organisations were invited to take part in the present study, and four organisations agreed to participate (the RDS, MRC, CIWF, and VS). To ensure anonymity of their members, the RDS, MRC, and VS all requested that we send questionnaires to them, and they subsequently sent them to a random selection of their members. (Questionnaires required only a tick agreeing to informed consent, therefore all responses remained anonymous.) The CIWF chose an alternative method, in that

they sent an email to all of their members saying that they supported this research and requesting that interested parties email the researchers directly. Those who did were sent the questionnaire either by post or electronically. To control for different data collection methods, data was collected from the control group via both such methods (i.e., approximately 200 potential participants were invited via email to participate, whilst questionnaires were sent directly to another 200 potential participants).

## **Data screening**

### ***Analysing counter-balance effects***

The questionnaire was counterbalanced in case the order presentation influenced responses. Questionnaires either: (i) measured attitudes toward animal use and belief in humans as superior first, then measured belief in animal cognition, sentience; or (ii) measured belief in animal cognition and sentience, then attitudes toward animal use and belief in humans as superior. (Both measured perceptions of choice last.) For data screening purposes we combined scores for belief in animal cognition and animal sentience, then independent groups t-tests were conducted to examine the effects of counterbalancing on overall mean scores for belief in animal cognition and sentience and overall mean scores for attitudes toward animal use. Order effects were not significant for belief in animal cognition and sentience ( $t(370) = -.121, p > .05$ ) or attitudes toward animal use ( $t(370) = .51, p > .05$ ), indicating that order of questioning did not have an effect on results. This factor has therefore been omitted from all subsequent analyses.

### ***Grouping participants according to organisation membership***

Overall mean scores for belief in animal mind and attitudes toward animal use were compared (see Table 6.2), between scientists (i.e., the Research Defence Society, the Biosciences Federation, and the Medical Research

Council<sup>2</sup>), and comparisons were also made between organisations predicted to be against animal use (i.e., Compassion in World Farming, and the Vegan Society).

Table 6.2. Mean scores for 'belief in animal mind' and attitudes toward animal use

Dependent Variable	Organisation	Mean scores
BAM	Research Defence Society (N=104)	3.06
	Biosciences Federation / Medical Research Council (N=51)	3.07
	Compassion In World Farming (N=80)	3.74
	Vegan Society (N=79)	3.90
	Control group (N=58)	3.24
Attitudes toward animal use	Research Defence Society	3.70
	Biosciences Federation / Medical Research Council	3.90
	Compassion In World Farming	1.79
	Vegan Society	1.54
	Control group	2.90

NOTE: High scores indicate more support for animal use and higher levels of belief in animal mind.

Independent groups t-tests were performed to compare the organisations RDS and BF and MRC, and to compare organisations CIWF and VS, on their mean scores for BAM and attitudes toward animal use. No significant differences were found between RDS and BF/MRC members for BAM ( $t(153) = -.47, p > .05$ ), nor attitudes toward animal use ( $t(153) = -3.974, p > .05$ ), and no significant differences were found between CIWF and VS members for BAM ( $t(153) = -3.104, p > .05$ ), nor attitudes toward animal use ( $t(153) = -3.791, p > .05$ ). Therefore RDS and BF and MRC members were re-categorised together to represent the 'scientist' organisations

<sup>2</sup> The Biosciences Federation were initially contacted and with our consent they shared our invitation to participate with the MRC. As a consequence, when questionnaires were returned, we could not identify whether the participant was a member of the BF or the MRC, and therefore data from these two organisations is combined.

(N=155), and CIWF and VS members were re-categorised as the 'animal welfare' group (N=159).

## **RESULTS**

Two MANOVAs were conducted on the data. The first aimed to examine factors that might underlie attitudes toward different types of animal use. Compared were the three groups of participants on their scores for attitudes towards the use of four different groups of animals (concerning five different types of animal use), and perceptions of choice, humans as superior, and belief in animal cognition and animal sentience. The second MANOVA compared groups on their scores for belief in animal cognition and belief in animal sentience for different species of animals in relation to the phylogenetic scale.

### **Attitudes toward animal use and underlying factors across groups of participants**

A 3 (group) X 4 ('type of animal questionnaire') MANOVA was conducted on the data to examine attitudes toward different types of animal use and factors that might underlie these across our three groups of participants. Independent variables were group of participants (i.e., the 'scientist' group, the 'animal welfare' group, and the control group), and type of animal (i.e., either (i) chimpanzees/ monkeys, (ii) dogs/ cats, (iii) rabbits/ guinea pigs, or (iv) rats/ mice). The thirteen dependent variables were attitudes towards animal use (for medical research, dissection, personal decoration, entertainment, and animal management), perceptions of choice (for medical research, dissection, personal decoration, entertainment, and animal management), humans as superior, and belief in animal cognition and belief in animal sentience. Gender, age and education were included as co-variates.

Multivariate tests (using Pillai's Trace as recommended by Coakes & Steed, 1999) showed significant main effects for type of animal ( $F(42,1038) = 1.92, p < .001$ ), and for group of participant ( $F(28,690) = 12.80, p < .001$ ). There was also a significant interaction between the two ( $F(84,2094) = 1.71, p < .001$ ).

Following this, three further MANOVAs were conducted in order to test whether uneven cell sizes had an impact on results. Each of these ran the same analyses as described above, but first used SPSS to select random cases so that all cell sizes were the same ( $n = 58$ ). That is, the numbers of participants in the 'scientist' and 'animal welfare' groups were reduced to the same size as the control group. In all three of these analyses, the main effects were the same as presented above, *but no interaction effect was found*. Since the interaction effect that was found in the first MANOVA did not appear to be robust, and because an interaction effect was not predicted, only main effects are reported and described as follows.

### **Main effects for type of animal**

Univariate tests revealed that type of animal had a significant effect only on attitudes toward using animals for entertainment ( $F(11,262.25) = 3.66, p < .05$ ). Post-hoc analyses showed that in their attitudes toward using animals for entertainment, participants were significantly more supportive of using monkeys ( $M = 2.39, SD = 1.09$ ) and dogs and cats ( $M = 2.28, SD = 1.27$ ), compared to rabbits and guinea pigs ( $M = 1.75, SD = .93$ ), and rats and mice ( $M = 1.80, SD = .96$ ). Although no predictions were made concerning the use of different types of animals and specific types of animal use, it was predicted that support would generally be lower for the use of chimpanzees/ monkeys and dogs/ cats, compared to rabbits/ guinea pigs and rats/ mice. The present study found no evidence to support this prediction, therefore Hypothesis 9 was rejected.

### **Main effect for group of participants**



Univariate results regarding group of participants main effect showed that there were significant differences between groups for all of the dependent variables (see subscripts in Table 6.3). Table 6.3 shows mean scores, standard deviations, and F values. Higher scores represent more support for animal use, more agreement that humans do have alternatives to using animals, higher levels of belief that humans are superior to animals, and higher levels of belief in animal cognition and sentience.

The 'scientist' group were more supportive of all types of animal use compared to the 'animal welfare' group, whilst the control group did not show a particular pattern in their views (therefore Hypotheses 1 & 2 were partially supported). Also, as predicted, compared to the 'animal welfare' group, the 'scientist' group presented lower levels of 'perceptions of choice' (for all types of use), higher levels of belief in 'humans as superior', and lower levels of belief in animal cognition and animal sentience, with scores for laypersons somewhere in the middle of these (therefore Hypotheses 3-6 were supported). Differences are discussed in more depth below.

**Table 6.3. Between-groups differences for all dependent variables**

		'Scientist' group (N=155)	Control group (N=58)	'Animal welfare' group (N=159)	F values (df = 2, 358)	Sig. (p <)
Medical research	Mean	5.33a	3.57b	1.48c	161.17	.001
	SD	1.46	1.7	.87		
Dissection	Mean	3.79a	3.59 a	1.78b	97.38	.001
	SD	1.33	1.32	.95		
Personal decoration	Mean	2.77a	1.87 b	1.191b	79.47	.001
	SD	1.25	1.08	.52		
Entertainment	Mean	2.83a	2.37b	1.39c	61.39	.001
	SD	1.04	1.05	.53		
Animal management	Mean	4.11a	3.29b	1.80c	89.20	.001
	SD	1.1	1.21	.84		
POC medical research	Mean	2.57a	4.05b	6.42c	68.41	.001
	SD	2.08	2.35	1.47		
POC dissection	Mean	3.86a	4.95b	6.22c	23.34	.001
	SD	2.03	1.92	1.68		
POC personal decoration	Mean	5.82a	6.53b	6.86b	8.18	.01
	SD	1.94	1.2	.76		
POC entertainment	Mean	5.9a	6.31a	6.90b	12.61	.001
	SD	1.77	1.49	.58		
POC animal management	Mean	4.11a	4.24a	5.76b	17.63	.001
	SD	1.68	1.88	1.99		
Humans as superior	Mean	4.76a	4.02b	2.45c	48.56	.001
	SD	1.22	1.51	1.46		
Animal cognition	Mean	2.81a	2.99a	3.62b	43.08	.001
	SD	.53	.36	.65		
Animal sentience	Mean	3.50a	3.72b	4.34c	82.15	.001
	SD	.48	.37	.35		

NOTE: Different subscripts across rows indicate where significant differences lie.

### **Between-group differences: The 'scientists' group versus other groups**

For attitudes toward using animals for *medical research*, the 'scientist' group were more supportive compared to the 'animal welfare' group and the control group. In terms of using animals for *dissection*, the 'scientists' were more supportive compared to the 'animal welfare' group, but did not differ to the control group. For attitudes toward using animals for *personal decoration* and *entertainment* and *animal management practices*, 'scientists' were more supportive compared to both the 'animal welfare' group and the control group.

Regarding belief in '*humans as superior*', the 'scientist' group scored higher than both other two groups. For belief in *animal cognition*, the 'scientists' scored lower than the 'animal welfare' group, but did not differ from the control group, whilst for belief in *animal sentience*, they scored lower than both other groups.

For *perceptions of choice*, the 'scientist' group scored lower (i.e., they believed in alternatives to using animals less) than both other groups in terms of using animals for *medical research*, *dissection*, and *personal decoration*. In terms of using animals for *entertainment* and *animal management practices*, the 'scientists' scored lower than the 'animal welfare' group, but did not differ from the control group.

### **Between-group differences: The 'animal welfare' group versus other groups**

For attitudes toward using animals for *medical research*, *dissection*, *entertainment*, and *animal management practices*, the 'animal welfare' group were less supportive compared to both the 'scientists' and the control group. Regarding views on the use of animals for *personal decoration*, the 'animal welfare' group were less supportive compared to the 'scientist' group, but not the control group.

For belief in '*humans as superior*', belief in *animal cognition*, and belief in *animal sentience*, the 'animal welfare' group differed from both other groups, in that they scored lower on '*humans as superior*', and higher on belief in *animal cognition* and *animal sentience*.

In terms of *perceptions of choice*, scores of the 'animal welfare' group were higher than both other two groups (i.e., they believed in alternatives to using animals more) for the use of animals for *medical research*, *dissection*, *entertainment*, and *animal management practices*, whilst for *personal decoration*, they scored higher than the 'scientists' but did not differ from the control group.

#### **Between-group differences: The control group versus other groups**

For attitudes toward using animals for *medical research*, *entertainment*, and *animal management practices*, the control group were less supportive compared to the 'scientist' group, and more supportive compared to the 'animal welfare' group. In terms of views on the use of animals for *dissection*, the control group did not differ from the 'scientists', but were more supportive than the 'animal welfare' group. In terms of using animals for *personal decoration*, the control group were less supportive compared to the 'scientists', but did not differ from the 'animal welfare' group.

For belief in '*humans as superior*', the control group scored lower than the 'scientists' and higher than the 'animal welfare' group. In terms of belief in *animal cognition*, they scored lower than the 'animal welfare' group but did not differ from the 'scientists', whilst for belief in *animal sentience*, the control group scored higher than the 'scientists' and lower than the 'animal welfare' group.

Finally, in terms of *perceptions of choice*, the control group scored higher than the 'scientist' group and lower than the 'animal welfare' group,

regarding using animals for *medical research*, and *dissection*. For *personal decoration*, the control group scored higher than the 'scientists', but did not differ from the 'animal welfare' group, whilst for *entertainment*, and *animal management practices*, they scored lower than the 'animal welfare' group, but did not differ from the 'scientists'.

### **Mean scores in relation to the neutral position of the Likert scale**

Since the score of '4' represented a neutral view towards animal use, we examined whether mean scores differed significantly (less or more) from this score. Fifteen one-sample t-tests (five types of animal use x three groups of participants) were conducted, comparing the neutral score of '4' to the mean scores for attitudes toward medical research, dissection, personal decoration, entertainment, and animal management practices.

#### ***The 'scientist' group***

Scores were higher than the neutral score for *medical research* ( $t(154) = 11.40, p < .001$ ), but were lower than the neutral score for *personal decoration* ( $t(154) = 12.23, p < .001$ ), *entertainment* ( $t(154) = 14.02, p < .05$ ). Scores representing attitudes toward using animals for *dissection* ( $t(154) = 1.98, p > .05$ ) and *animal management practices* ( $t(154) = 2.38, p > .05$ ) did not differ from the neutral point. Hence, 'scientists' showed support for medical research, were against personal decoration and entertainment, and neutral in their views on dissection and animal management practices.

#### ***The 'animal welfare' group***

Scores were lower than the neutral score of '4' for *medical research* ( $t(158) = 36.63, p < .001$ ), *dissection* ( $t(158) = 29.63, p < .001$ ), *personal decoration* ( $t(158) = 67.40, p < .001$ ), *entertainment* ( $t(158) = 63.06, p < .001$ ), and *animal management practices* ( $t(158) = 33.18, p < .001$ ). This shows that this group opposed all types of animal use.

***The control group***

Scores were lower than the neutral point for *personal decoration* ( $t(57) = 15.00, p < .001$ ), *entertainment* ( $t(57) = 11.82, p < .001$ ), and *animal management practices* ( $t(57) = 4.49, p < .001$ ). However, scores did not differ from the neutral point for attitudes toward using animals for *medical research* ( $t(57) = 1.93, p > .05$ ), and *dissection* ( $t(57) = 2.35, P > .05$ ).

Thus, the control group presented neutral views toward medical research and dissection, and opposed the use of animals for personal decoration, entertainment, and animal management practices.

**Between-groups comparisons of BAM for different animals**

The second (mixed design) MANOVA was conducted to compare group of participants (a between-subjects factor) on belief in animal cognition and animal sentience for different species of animals (a within-subjects factor). This was a 3 (i.e., group of participants) X 13 (i.e., species of animals) design, with belief in animal cognition and belief in animal sentience as the two dependent variables. Gender, age, and education were included as co-variates, and linear trend analysis was incorporated into this MANOVA in order to examine whether the thirteen animals were rated in comparison to each other in a way that reflected the phylogenetic scale. The order of entry for the linear trend analysis was as follows: first chimpanzees, followed by monkeys, dogs, cats, pigs, cows, sheep, rabbits, guinea pigs, rats, mice, birds, and fish. This was based on the phylogenetic scale (from Herzog & Galvin, 1997).

Multivariate effects (using Pillai's Trace) were significant for group of participants ( $F(4,732) = 48.78, p < .001$ ), and for species of animal ( $F(24,8784) = 5.95, p < .001$ ), and interaction effects between these two were also significant ( $F(48,8784) = 8.59, p < .001$ ).

As done with the previous MANOVA, an additional three MANOVAs were conducted to examine whether uneven cell sizes were having an effect on

results. These were conducted as described above, but first used SPSS to select random cases so that all cell sizes were the same ( $n = 58$ ). That is, the numbers of participants in the 'scientist' and 'animal welfare' groups were reduced to the same size as the control group. In all three of these analyses, the findings were the same, indicating that uneven cell sizes were not having an impact on findings. Therefore all findings are reported as follows.

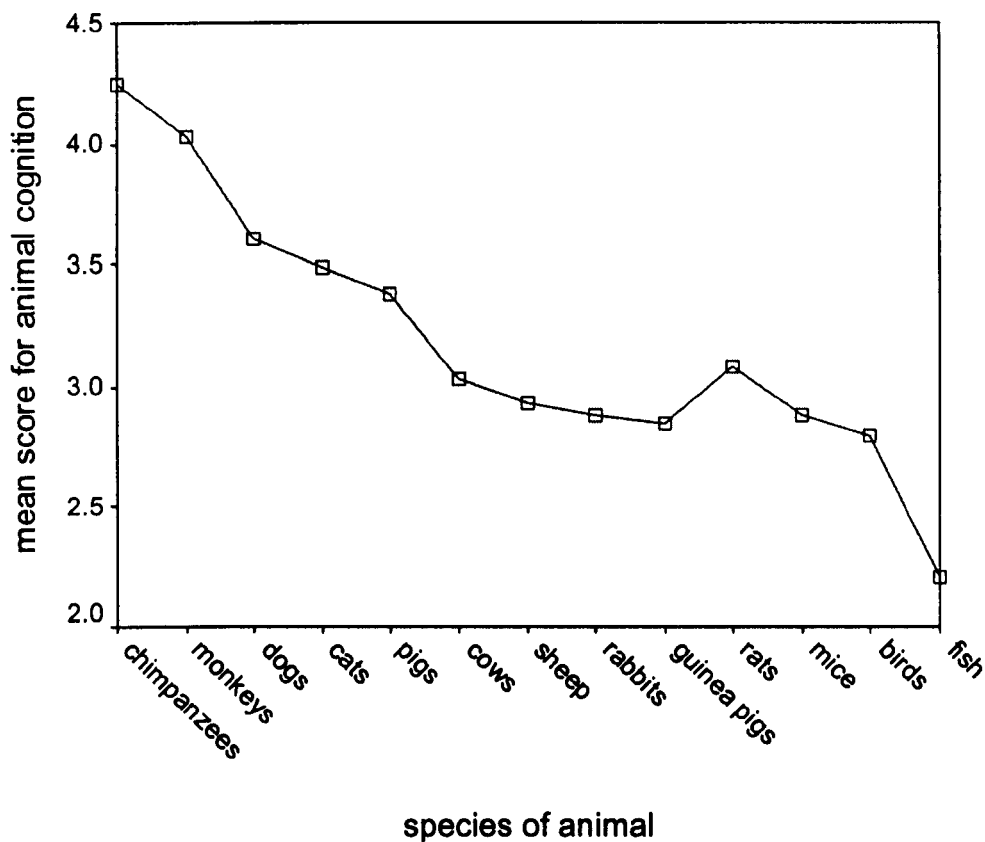
### **Main effects for species of animal**

Univariate tests were significant for animal cognition ( $F(5.46, 1997.20) = 11.38, p < .001$ ), and animal sentience ( $F(5.91, 2162.79) = 2.73, p < .001$ ), indicating that belief in animal cognition and animal sentience differed for different species of animal.

### ***Belief in animal cognition***

Linear trend analysis was significant for belief in animal cognition ( $F(1, 366) = 25.82, p < .001$ ), in that scores for possession of cognitive ability were highest for chimpanzees, and generally decreased in the order expected, with scores lowest for fish. However there also a significant quadratic trend ( $F(1, 366) = 10.36, p < .01$ ), and a significant cubic trend ( $F(1, 366) = 9.69, p < .01$ ), indicating that caution should be taken when interpreting findings. Analyses of scores showed a quadratic trend in that there was a general decrease in scores for cognition from chimpanzees down to guinea pigs. There was then however a rise in scores for cognition in rats, which was followed by another general decrease for cognition in mice, birds, and fish. The cubic trend showed that scores for cognition decreased generally from chimpanzees to guinea pigs, then increased for rats, then decreased for scores for mice, birds and fish. Figure 6.4.1 presents the trends for scores in cognition for different species for all groups of participants.

Figure 6.4.1. Belief in animal cognition for thirteen species of animals

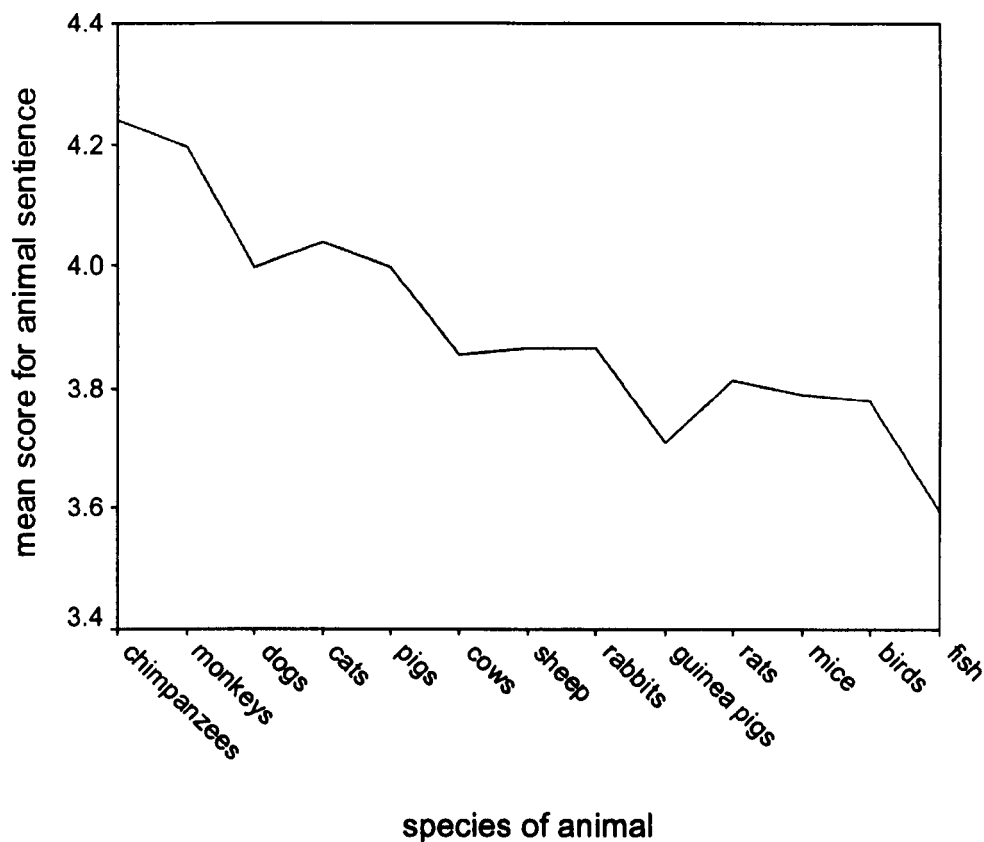


**Belief in animal sentience**

Linear trend analysis was also significant for belief in animal sentience ( $F(1,366) = 5.04, p < .05$ ), with scores generally decreasing with chimpanzees perceived to possess the highest cognitive abilities, and fish possessing the least. Again, a significant quadratic trend was also found ( $F(1,366) = 5.07, p < .05$ ). Examination showed that there was a general decrease in scores for animal sentience from chimpanzees down to guinea pigs, followed by a rise in scores for rats, mice and birds, followed by a sharp decline for fish. A significant cubic trend did not emerge for this variable. Figure 6.4.2 presents the scores in animal sentience for different species for all groups of participants.



Figure 6.4.2. Belief in animal sentience for thirteen species of animals



**Belief in animal cognition and sentience across groups of participants**

Mean scores for belief in animal cognition and sentience across groups are presented in Figures 6.5.1 and 6.5.2. Figure 6.5.1 indicates that participants tended to rate the different species of animals for cognition in a way that reflects the phylogenetic scale.

Figure 6.5.1 Belief in animal cognition for different species across groups

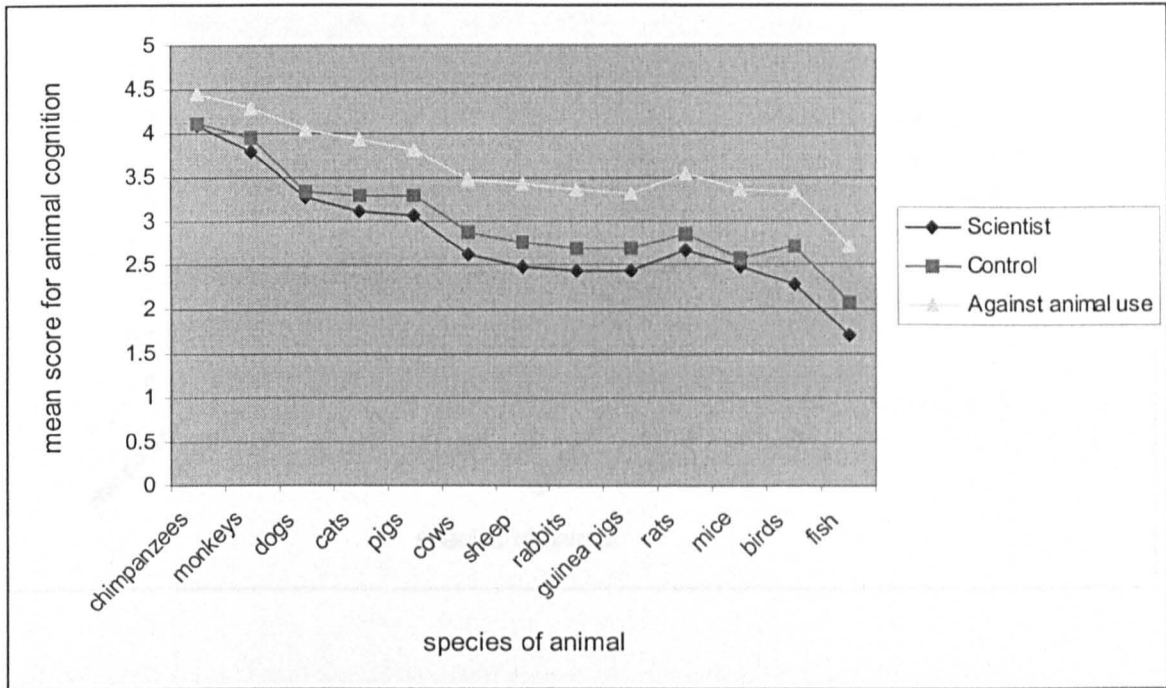


Figure 6.5.2 shows that the trend for belief in animal sentience for the thirteen species was not as straightforward as anticipated. Beliefs about chimpanzees were believed to have the highest cognitive abilities, followed by monkeys, dogs, cats, pigs, rats, mice, and fish. As expected, the larger-brained animals (pigs, cows and sheep) were rated higher than some of the smaller-brained animals (i.e. rabbits and guinea pigs), although rats were the exception to this as they were perceived as having higher mental abilities than all animals excepts chimpanzees, monkeys, dogs, cats and pigs. All groups showed a sharp decline in belief in animal cognition for fish.

Figure 6.5.2. Belief in animal sentience for different species across groups

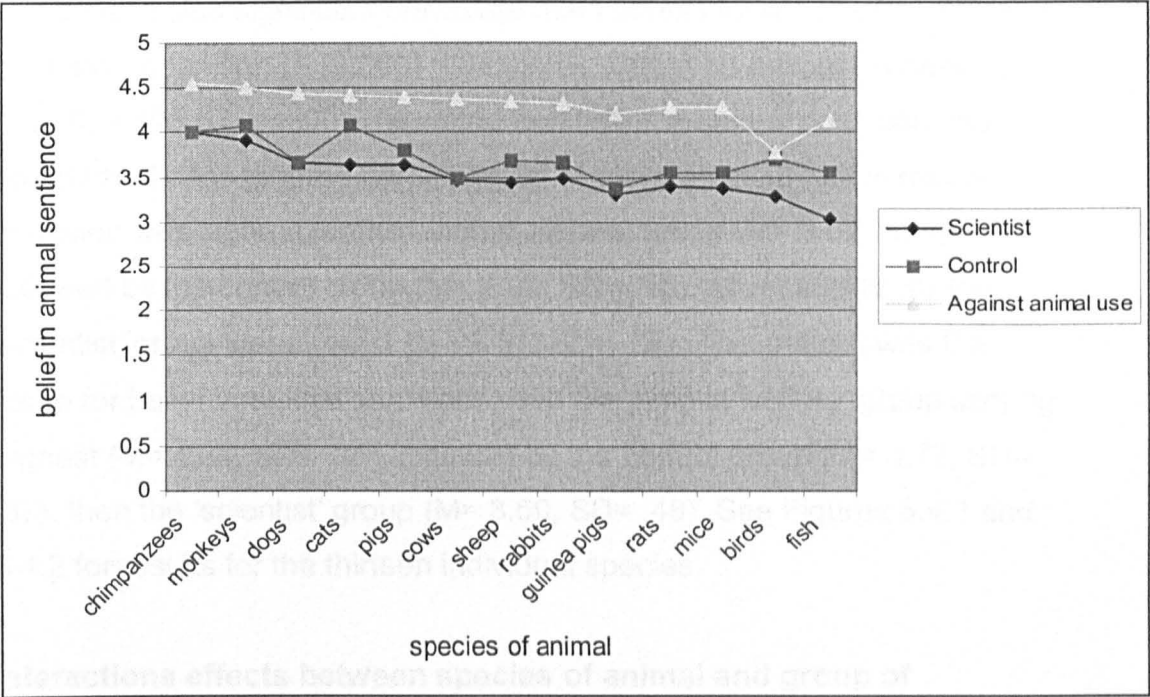


Figure 6.5.2 shows that the trend for belief in animal sentience for the thirteen species was not as straightforward as anticipated. Beliefs about animal sentience for different species were less straightforward than for animal cognition, although the general trend tended to reflect the phylogenetic scale. That is, chimpanzees and monkeys were situated at the top of the scale, and dogs, cats and pigs were next on the scale. Cows, sheep, rabbits, rats, mice, and birds were all perceived to experience similar levels of sentience, guinea pigs were below these, and fish were perceived to experience the lowest levels of sentience. The 'scientist' group and the 'animal welfare' group seemed to rate animals in a way that generally reflected the phylogenetic scale, although the latter showed a large drop in belief in animal sentience for birds. Scores for the control group were the least consistent.

### Main effects for group of participants

There were also significant univariate main effects for group of participants on animal cognition ( $F(2,366) = 62.39, p < .001$ ) and animal sentience ( $F(2,366) = 128.57, p < .001$ ), showing that belief in animal cognition and animal sentience differed across group of participants. Belief in animal cognition was highest for the 'animal welfare' group ( $M = 3.62, SD = .65$ ), followed by the control group ( $M = 2.99, SD = .36$ ), whilst scores for the 'scientist' group were lowest ( $M = 2.81, SD = .53$ ). This pattern was the same for belief in animal sentience, with the 'animal welfare' group scoring highest ( $M = 4.34, SD = .35$ ), followed by the control group ( $M = 3.72, SD = .37$ ), then the 'scientist' group ( $M = 3.50, SD = .48$ ). See Figures 6.4.1 and 6.4.2 for results for the thirteen individual species.

### Interactions effects between species of animal and group of participants

Significant univariate interaction effects were also found between group of participants and species of animal regarding both animal cognition ( $F(24,4392) = 7.57, p < .001$ ), and animal sentience ( $F(24,4392) = 12.31, p < .001$ ).

In order to see whether each separate group of participants rated different species for animal cognition and animal sentience in a way that reflects the phylogenetic scale, the data file was split according to the three groups and the above analyses were repeated but this time analysing groups separately.

For *belief in animal cognition*, linear trends were found to be significant for the 'scientist' group ( $F(1,154) = 1381.75, p < .001$ ), the 'animal welfare' ( $F(1,158) = 508.98, p < .001$ ), and the control group ( $F(1,57) = 571.30, p < .001$ ). That is, as shown in Figure 6.4.1, each separate group rated the thirteen species of animals for cognition in a way that reflected the phylogenetic scale (therefore Hypothesis 7 was supported).

Findings for *belief in animal sentience* were similar, with significant linear trends found for the 'scientist' group ( $F(1,154) = 302.07, p < .001$ ), the 'animal welfare' group ( $F(1,158) = 96.40, p < .001$ ), and the control group ( $F(1,57) = 75.67, p < .001$ ). Thus, as shown in Figure 6.4.2, whilst there were between-groups differences on scores for belief in animal sentience, each separate group tended to rate animals for sentience in a way that reflected the phylogenetic scale (therefore Hypothesis 8 was accepted). However, all of the above analyses again showed that cubic and quadratic trends were also significant, and therefore a similar warning of caution is needed in terms of interpreting results.

## DISCUSSION

Scientists involved in the use of animals for their research are often met with hostile press and portrayed in a negative light in the literature of their opponents. They have been depicted as uncaring toward their animal subjects and inclined to reject the possibility of animal mind (Baldwin, 1993; Blumberg & Wasserman, 1995). The lack of research in this area does little to dispel these claims. The present research indicates that first; scientists are not uni-dimensional in their views toward animal use. That is, scientists were more supportive of all types of animal use *compared to the animal welfare group*, and did show more support for the use of animals for medical research. However, scientists were actually against personal decoration and entertainment, and neutral in their views on dissection and animal management practices. Second, scientists were found to believe most species of animal to possess at least 'moderate' cognitive ability and sentience. And third, in comparison to laypersons, both scientists and animal welfare people at times held significantly more extreme views toward animal use, whilst at other times they did not.

Findings indicate that both scientists and animal welfare groups are sometimes more extreme in their views compared to laypersons, and that the opinions of neither group better represent those of the general public<sup>3</sup>. Hence, each of these groups need to acknowledge this, and animal welfare groups and the media need to accept that scientists (i) are not necessarily in favour of all types of animal use, and (ii) do not reject the notion of animal mind. Although the present study involved mostly British participants, findings may be of interest to other scientists who use animals in their research, since results show scientists in a more positive light than is often portrayed. Hence it may be advantageous for scientists to be more open to those seeking to examine their views since only by participating in such research can their voice be heard.

### **Psychological processes and attitudes toward animal use**

Previous research has shown that when alternatives to using animals are perceived to exist, then support for animal use is lower (as found by Knight et al., 2003). Hence, different levels of perceptions of choice relating to animal use may be one factor that explains why the 'scientist' and 'animal welfare' group held polarised attitudes toward animal use. That is, perceptions of choice was high for the 'animal welfare' group and low for the 'scientist' group (for all five types of animal use). This notion is substantiated in that support for medical research was highest (compared to other uses), whilst perceptions of choice for medical research was lowest. Furthermore, whilst the 'scientist' group were most supportive of animal use *compared to other groups*, their mean scores were below 'neutral' for dissection, personal decoration, and entertainment, showing that they were actually against these uses, whilst their perceptions of

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<sup>3</sup> It must be noted that because our control group was matched to the other groups for educational background, a high percentage of our 'laypersons' were university staff. Future research wanting to examine the views of laypersons may need to include samples that are matched in other ways.

choice for these uses were high. Thus the 'scientist' group may support using animals for medical research but not support other types of animal use because that they can think of alternatives to using animals for dissection, entertainment and personal decoration, but not for medical research. Indeed, scientists often use lack of alternatives as a justification for animal research (Gallup & Suarez, 1985; Feeney, 1987), whilst alternatives to other types of use (e.g., drag hunting instead of fox hunting, cruelty-free cosmetics rather than those tested upon animals, dissection-simulation software instead of animal dissection) are more evident.

In the present study, the 'scientist' group reported the highest levels of belief in humans as superior to animals, laypersons scored close to the neutral point, whilst the 'animal welfare' group scored lowest on this factor. This indicates that using the notion of the superiority of humans to justify animal use may go some way to explaining different attitudes toward animal use. Indeed, the inequality that represents human relations with animals may be central to the often ambivalent attitude we have toward the use of animals (Tuan, 1984). This view of animals *in relation* to human beings may reflect a wider attitude orientation, since attitudes are multi-layered, complex (Kalof, 2000), and interwoven with other political and social values (Buss, et al., 1986). Kellert's typology (1980) of attitudes toward animals and the environment describes a dominionistic point-of-view as one that supports human mastery and control over animals and would incorporate a belief in humans as superior. Thus, using Kellert's typology, scientists would be categorised as dominionistic, whilst other groups would not. Alternatively, Buss, et al. (1986) identified two broad categories of 'world-views' found to relate to work, the environment and all living creatures. The first emphasises high-growth, high-technology, materialistic growth, and rational, quantified decision-making processes, and views animals and the environment as products to be used as necessary. The second alternative world-view supports the redistribution of resources, lower levels of consumptions, and decision-making guided

by non-materialistic values. The former type of world-view may be more likely to represent the views of our 'scientist' group, whilst the latter may be more representative of the views of our 'animal welfare' group.

### **Belief in animal cognition and sentience**

It has been suggested that if scientists reject the notion of animal mind, the denial of such animal awareness may be one factor why some people can participate and support animal research, whilst others could not (Plous, 1993). The present study at first seems to lend some support to this idea, since belief in animal sentience was lowest for the 'scientist' group, whilst support for medical research was highest (whilst the opposite trend was observed for the 'animal welfare' group). However, the effect of belief in animal cognition was not as straightforward, since the 'scientist' group did not differ from the laypersons on their scores for this factor, yet the laypersons were significantly less supportive of using animals for research. Thus it seems that belief in animal sentience has a stronger relationship with attitudes toward animal use than does belief in animal cognition. In support of this, Herzog and Galvin (1997, p.247) described belief in animal sentience as "the ultimate moral leveller", and found that whilst belief in animal sentience was related to attitudes toward animal use, belief in animal cognition was not. Furthermore, other researchers agree that the perceived capacity of animals to experience pain and suffering has the most influence on attitudes (Plous, 1993; Rollin, 1989). In the present study the 'scientist' group held at least moderate levels of belief in animal sentience, yet still supported using animals for medical research. This indicates that although scientists do believe in animal sentience, this did not have a strong impact on their attitudes toward animal use in terms of using animals for medical research. One reason for this may be that attitudes toward different types of animal use are influenced by different factors, or it may be that factors have varying degrees of impact, depending upon the type of animal use in question (as suggested in Study 3 of this thesis). For example, when considering their



views on medical research, people may believe that there are no alternatives to using animals, and this belief may outweigh the impact of belief in animal sentience. This would explain why support for animal research remains high for scientists, and why previous research has found support for medical research to be higher than other types of animal use (Knight, et al., 2003; 2004).

In relation to belief in animal cognition and sentience for different species of animals, participants' ratings reflected the phylogenetic scale, with chimpanzees and monkeys at the top of this, dogs, cats, and larger-brained farm animals in the middle, and smaller-brained animals at the bottom. Furthermore, trend analyses showed that all groups of participants rated animals for cognition in a way similar to the phylogenetic scale. Thus, whilst the scale has been criticised for being an inappropriate classification measure of animal mind, it does actually seem to reflect what people believe, and this includes scientists who have in the past rejected the phylogenetic scale as being incorrect. However, it should be noted that both a cubic and quadratic trend emerged for animal cognition, and a quadratic trend was also found for animal sentience. One reason for significant linear, quadratic and cubic trends for belief in animal cognition might be that whilst people will rate animals in a way that generally reflects the phylogenetic scale (i.e. with chimpanzees and monkeys at the top and birds and fish at the bottom), species in-between these tend to be grouped as similar in their cognitive abilities. For example: chimpanzees and monkeys are perceived as cognitively similar; followed by dogs, cats, and pigs; then cows, sheep, rabbits, and guinea pigs; then rats; then mice, and birds; then fish. The cognitive abilities of these groups are highest for the first group, followed by the second and third group, then scores rise sharply for rats. These then decline again for the fifth group, ending with a sharp decline for fish. Hence, people may group animals together, but rate these in a way that generally reflects the phylogenetic scale, with the exception of rats that are perceived to have higher cognitive abilities than

cows, sheep and rabbits. Such findings deserve further investigation from future research.

In relation to belief in animal sentience, a significant linear trend was revealed for the thirteen species, in that again chimpanzees and monkeys were attributed the highest scores, whilst fish were attributed the lowest. However, a quadratic trend was also revealed, and examination of scores indicated that again there seemed to be a fall and rise between species that appeared to be grouped together. That is: chimpanzees and monkeys were believed to possess similar sentient capabilities; followed by dogs, cats and pigs; then cows, sheep, and rabbits; then guinea pigs; then rats, mice, and birds; then fish. With the exception of guinea pigs, these groupings reflect those shown in examination of scores for animal cognition, hence providing support for the notion that people tend to perceive groups of animals as possessing similar cognitive and sentient abilities.

Graphs demonstrating belief in animal cognition and sentience showed that scores for animal sentience appear less consistent than those for animal cognition. This reflects findings from Herzog and Galvin (1997) who also showed that, with a sample of laypersons, ratings of different species for belief in animal sentience were less linear than were ratings for belief in animal cognition. Therefore, when people think about the emotional experiences of different species, their beliefs are more variable than when considering the cognitive abilities of different species. The graphs also reveal that for animal sentience, the control group rated animals less consistently than did the 'scientist' group and the 'animal welfare' group. One surprising finding was that there was a sharp decline in scores for the sentient abilities of dogs, and a sharp incline for the sentient abilities of cats. However, this pattern did not emerge for ratings of animal cognition, indicating that whilst dogs and cats are believed to possess similar cognitive abilities, cats are believed to be more sentient than dogs. This is

an interesting finding that is not reflected by the scores of the 'scientists' nor the 'animal welfare' group, and would be an interesting area for future research.

### **Group membership and attitudes toward animal use**

Between-group comparisons showed that the 'scientist' group were most supportive of all types of animal use, whilst the 'animal welfare' group were least supportive. Whilst internal factors (as described previously) will have influenced the attitudes of these groups, group membership (i.e., an external factor) is also important. That is, attitudes of participants in the present study are likely to have been influenced by group membership, personal relevance and in-group, out-group bias. However, it is important to note that, as mentioned earlier, whilst the 'scientist' group were significantly more supportive of all types of animal use *compared to the 'animal welfare' group*, they were actually against using animals for dissection, personal decoration, and entertainment. Thus it seems that the influence of group membership and personal relevance may be very specific, in that the 'scientist' group are more supportive of using animals for research because of their involvement in research and membership in such a group, but that this does not have an impact upon their views toward other types of animal use. This is an important finding since groups opposing animal use often portray scientists involved in animal research as holding uncaring attitudes toward animals and excluding them from any moral consideration (Baldwin, 1993). This does not seem to be the case in the present study since the 'scientist' group are generally against using animals for reasons other than medical research. In contrast, the 'animal welfare' group were generally against all types of animal use, reflecting a view toward animal use that is less specific than those involved in medical research. This is likely because animal welfare groups represent opposition to animal use in general, whilst science groups represent support for the use of animals in their field (i.e., medical research). These

findings provide further evidence to support the effect of involvement and personal relevance on attitudes.

### **Attitudes in relation to type of animal used**

The present research measured attitudes toward the use of different types of animals, and it was predicted that support would be lowest for the use of chimpanzees/ monkeys and dogs/ cats (i.e. 'higher' animals, and popular pets). However, the only significant effect of 'type of animal' involved was concerning attitudes towards using animals for entertainment, where support was actually higher for the use of these two groups of animals compared to rabbits/ guinea pigs and rats/ mice. One explanation for this might be that people imagine two popular uses of animals in terms of keeping animals in zoos and as pets. In terms of these uses, dogs and cats are the most popular animals to keep as pets (Wells & Hepper, 1997), and monkeys and chimpanzees are most likely to be seen in zoos (compared to rabbits, guinea pigs, rats and mice). Thus when thinking about pet keeping and zoos, support was higher for these types of animals because people are habituated to the idea of keeping these animals for these reasons, and because, unlike medical research, dissection and personal decoration, keeping animals in zoos and as pets does not cause overt pain or tangible harm to the animals involved.

That attitudes were generally not influenced by 'type of animal' involved is somewhat surprising and difficult to explain, since this finding contradicts previous research (e.g., Braithwaite & Braithwaite, 1982; Driscoll, 1992). These earlier studies have tended to include different types of animal as a within-subjects factor, and it may be that the relationship between type of animal and attitudes toward animal use may be a subtle one that may not emerge unless participants have to compare the use of one type of animal to that of another. In the present study, type of animal was a between-groups factor, in that participants were asked about their attitudes toward the use of either chimpanzees/ monkeys, or dogs/ cats, or rabbits/ guinea

pigs, or rats/ mice. That our findings were different to previous research may be a result of using a different methodology, and hence this should be considered at the design stage of future research aiming to examine attitudes toward the use of different types of animals.

### **Future directions for research in this area**

Previous research has shown that factors such as affection for animals and cost-benefit analysis (weighing up the costs to animals against the benefits to humans) are also important underlying factors of attitudes toward animal use (Baldwin, 1993; Gray, 1987; Knight, et al., 2003; Miller, 1985). Hence it is recommended that future research include such measures when examining underlying factors of attitudes toward animal use, especially when including scientists and their opponents as participants. Further, it would be interesting to examine whether factors that underlie attitudes toward animal use can be manipulated in such a sample of participants, and if so, what effect this might have. For example, if perceptions of choice could be manipulated (i.e., if people could be persuaded that alternatives are available, or be persuaded that alternatives are not available), then this may be one way of changing people's views on the use of animals. Future research in this area would be invaluable, since the successful manipulation of underlying factors may have a number of useful applications. For example, scientists needing support for their research may focus on lack of alternatives to using animals, whilst those wanting to promote the positive treatment of animals could focus on encouraging affection for animals (perhaps through positive experiences), and belief in the mental abilities of animals.

Future research also needs to examine the relationship between internal and external factors that underlie attitudes toward animal use, since combinations of underlying factors may have a mediating and/ or moderating effect on each other and their impact on attitudes. Research is now needed that examines the factors found to be important in the present

study, together with factors identified in other studies, such as cost-benefit analysis, attitudes toward animals, and gender. This research needs to also examine the weighting people attach to the factors they consider when thinking about their views on animal use. For example, it might be that scientists attach more weighting to the benefits of research and the lack of alternatives to animals, whilst those opposing animal use attach more weighting to the cognitive abilities of animals and their capacity to feel emotion and pain. Research needs to examine whether this is the case, and if so, why is this so? It might also be interesting to examine the views of scientists and their 'opponents' in terms of their wider attitudes orientation, to see where their attitudes toward animals and views on the use of animals fit with their attitudes toward other social and political issues.

## **Conclusions**

There is little research that tells us about the views and beliefs of scientists concerning animal use and animal mind. The present study indicates that scientists believe most species to have at least a moderate capacity for cognition and sentience, and showed that, whilst they were supportive of using animals for medical research, they did not support other types of animal use. Thus it seems that scientists are not uni-dimensional in their views toward animal use, although they are frequently portrayed as such by the media and in the literature of opposing groups. The present study also provides evidence for social judgement theory, in that people's attitudes toward the use of animals are influenced by psychological factors (i.e., internal factors) and group membership (i.e., an external factor). Cognitive dissonance is likely also to have played a role in this relationship. Hence it seems that how we process information, and how we are influenced by our social world, will help explain why different

Study 5: Factors underlying attitudes towards animal use: a study of scientists and animal welfare persons

people hold opposing views toward the use of animals.

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## **CHAPTER 7**

### **STUDY 6: DETERMINANTS OF CONFLICT BETWEEN SCIENTISTS AND OPPONENTS OF ANIMAL RESEARCH**

#### **AIMS:**

1. To examine the relative weighting of psychological factors in relation to attitudes toward animal use, with a sample that comprises scientists involved with animal use issues, animal welfare persons, and a control group of laypersons.
2. To develop a measure of empathy that examines empathy specifically toward animals.
3. To examine between-groups differences in terms of the relationship between empathy toward humans, empathy toward animals, and attitudes toward animal use.
4. To examine between-groups differences in terms of their value systems and how these relate to attitudes toward animal use.

**ABSTRACT**

The present research focuses on psychological factors underlying attitudes toward animal use. Factors examined were perceptions and beliefs concerning animals and animal use, empathy toward humans and animals, and value systems. A questionnaire was completed by 177 participants that were allocated into one of three groups: scientists involved with animal use, opponents of animal use, and a control. Perceptions and beliefs concerning animals and animal use, and instrumental and terminal values were ranked in order of importance by participants, in order to determine the relative importance of these. A general measure of attitudes toward the use of animals for medical research was taken, and the Interpersonal Reactivity Index (Davis, 1981) was developed and used to examine empathy toward humans and animals. Analyses demonstrated that scientists and laypersons (i.e., the control) differed significantly on very few measures. They presented comparable levels of support for the use of animals for medical research, ranked perceptions, beliefs and most values in a similar way, and differed on only one of eight measures of empathy. Both of these groups differed from opponents of animal use on most measures. Of all factors examined, those that best discriminated between the groups were: belief in animal rights, the benefits of medical research, equality, humans as superior, social recognition, and perceptions of choice. Further, whilst opponents of animal use were generally less empathic toward humans compared scientists and laypersons, scientists were generally as empathic toward animals as were opponents. It was proposed that examination of such factors is the way forward for research interested in the basis of attitudes toward animal use.



## INTRODUCTION

Life is full of contradictions, dilemmas, and uncomfortable choices that we as humans have to face and resolve. The use of non-human animals<sup>1</sup> by humans (i.e. 'animal use') is a contentious topic that evokes strong and emotional reactions from opposing parties. Further, the variety of ways in which animals are used result in attitudes that are not uni-dimensional; a person may support one type of animal use and oppose another (Knight, Vrij, Nunkoosing, & Cherryman, 2004). One type of use that often attracts attention is that of using animals for medical research. Debate requires scientists to fiercely defend their work whilst those supporting animal welfare and animal rights remain firm in their defence of the animals involved. Each has accused the other of being anti-intellectual, sadistic, and uncaring, conveying to their opponents distrust, suspicion, and, at times, hatred; yet the majority of accusations lack empirical support (Coile & Miller, 1984; Gluck & Kubacki, 1991). So what is it that leads to such division between groups concerning the subject of animal use? What is the source of such conflict? The present research focuses on factors underlying attitudes toward animal use in order to understand why some people show great concern for animal use whilst others are largely indifferent (Herzog & Galvin, 1997; Paul, 1995; Paul & Serpell, 1993).

### **Perceptions and beliefs concerning animals and use of animals for medical research**

Knight and colleagues have conducted a number of studies in this field that have identified factors that influence people's views on this topic (Knight, Nunkoosing, Vrij, & Cherryman, 2003; Knight, et al., 2004; and Studies 3-5 in this thesis). Findings from these can be seen as original and contributing to the field of human-animal relations because the factors identified are primarily psychological factors (such as perceptions and beliefs). Other researchers have tended to focus on participant characteristics such as gender, experience of animals, and age, in order to

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<sup>1</sup> Referred to from this point forward as animals; meaning all animals other than humans.

understand why people have different views toward animal use (e.g., Furnham & Pinder, 1990; Kellert & Berry, 1987; Wells & Hepper, 1997), but the psychological processes underlying views on animal use have a larger impact on our attitudes than do these personal characteristics (see Study 3 in the present thesis). Psychological factors that have most impact are perceived alternatives to using animals ('perceptions of choice'), belief in humans as superior to animals ('humans as superior'), belief in the mental abilities of animals ('belief in animal mind'), weighing up the costs and benefits of animal use ('cost-benefit analysis'), and attitudes toward animals (Knight, et al., 2003; 2004; Study 3 of the present thesis).

### **Extreme attitudes toward animal use**

Whilst the research described so far has informed us about the factors that might underlie attitudes toward animal use, little is known about those directly involved in the animal experimentation debate (Herzog & Galvin, 1997; Paul, 1995). The few exceptions include studies that examined the perspectives of: animal laboratory workers (Arluke, 1988); animal rights supporters (Herzog, 1993); and scientists and opponents of animal use (Paul, 1995). Both Arluke and Herzog described large variability in the views and actions of the particular groups that they studied. Paul explained the polarised views of scientists and opponents of animal use in terms of these groups focusing on different factors in order to defend or justify their stance. Animal suffering was the main criterion used by opponents of animal use to decide on the admissibility of animal experimentation, whilst scientists focused on the value and outcomes of research. A more recent study included a sample of scientists involved with animal research and animal welfare persons, examined the relationship between attitudes toward animal use and perceptions of choice, humans as superior, and belief in animal mind (see Study 5 of this thesis). Opposing views on animal use could be explained in terms of these factors, for example, scientists agreed more that humans are

superior than animals, hence this may be one reason why they find animal use acceptable compared to others who do not.

### **The relative impact of factors on attitudes toward animal use**

Paul's (1995) research found that groups that hold opposing views on animal use had a fair understanding of both sides of the animal experimentation debate; hence parties may have the same information available to them but held opposing views on the subject of animal use. This suggests that it may be the *relative importance* of such factors that explains opposing attitudes. For example, animal discomfort and human interests are not evenly weighted when people consider animal experimentation; people use different decision-making methods (Staffleau, 1994). Different parties may consider the same factors when thinking about their views on animals, but have different views on these or attach different weightings to these factors; this would explain how people can consider the same information but reach opposing views on a subject. Table 7.1 demonstrates how factors might influence opposing views on the use of animals for medical research.

**Table 7.1. Perceptions and beliefs concerning animals and their use in medical research**

Factors underlying attitudes	Support animal use	Oppose animal use
Perceptions of choice	Perceived lack of alternatives to using animals for medical research	Perceived availability of alternatives to using animals for medical research
Humans as superior	Belief that humans are more important than animals	Belief that humans and animals are of equal importance
Benefits of animal use	Perceived benefits of animal research	Perceived lack of benefits of animal research
Animal rights	Belief that animals do not have rights	Belief that animals have rights
Animal sentience	Belief that animals do not experience pain	Belief that animals do experience pain
Concern for animals	Lack of concern for the well-being of animals	Concern for the well-being of animals
Costs of animal use	Perceived cost caused to animals involved	Perceived cost caused to animals involved

Scientists can defend their work with animals by emphasising, for example: lack of alternatives to using animals; the belief that animal use is acceptable because humans are more important than animals; the benefits of animal research; that animals do not have rights; that animals do not experience pain; and so on. However, some scientists may have a different perspective in that they accept the concept of animal rights and/or the existence of animal sentience, but place more emphasis on the benefits of animal use. That is, the perceived benefits outweigh or override any impact that factors such as belief in animal rights and animal sentience might have on attitudes. On the other hand, those who oppose animal research might focus their arguments on the existence of alternatives to using animals for medical research, and that animals have a right not to be involved in such practices. Some may believe in the benefits of animal research, but they may also believe that causing pain to

animals outweighs such advantages. That is, the two opposing groups have different beliefs and perceptions concerning some factors, and attach different values to issues.

The present research measured differences between groups on these factors by including a ranking task to show how different groups place different value on these factors relating to animal use. Hence, the relative importance of such factors is examined, by requiring participants involved with animal use issues (scientists involved with using animals for research, and opponents of animal use) and a control group, to rank order these in order of importance. Further, a measure of empathy (Davis, 1980) is included and the Value Survey (Rokeach, 1973) that examines people's terminal and instrumental values. All factors are examined in relation to attitudes toward the use of animals for medical research, in order to determine which factors best distinguish between scientists, opponents of animal use, and laypersons.

### **The role of empathy in attitudes toward animal use**

Empathy has been defined as the 'reactions of one individual to the observed experiences of another', (Davis, 1983, p.113); a multi-dimensional construct that consists of understanding another's perspective (i.e., a cognitive component) and sharing the others perspective (i.e., an affective component) (Davis, 1980; Eisenberg & Strager, 1987; Smith, 1975; Spencer, 1870). The cognitive component represents the person's ability to recognise and understand another person's emotion, whilst the affective component represents an emotional response in-line with another persons' perceived feelings. Historically, researchers focused on the cognitive aspects of empathy or the affective aspects, but more recently measures such as the Interpersonal Reactivity Index (IRI) integrate the two elements as an interdependent system (Davis, 1980). Davis (1980) introduced empathy as a set of inter-related but discriminable constructs; hence the IRI comprises four-quantifiably different sub-scales: Empathic

Concern, Personal Distress, Perspective Taking, and Fantasy. Empathic Concern (EC) refers to warmth, compassion, sympathy and concern felt for others. Personal Distress (PD) refers to experiencing feelings of discomfort, anxiety and unease in tense interpersonal settings such as witnessing negative experiences of others. Perspective Taking (PT) refers to the tendency to spontaneously to adopt the psychological perspective of others. Fantasy (FS) represents to the tendency to identify with, and imagine oneself as in the place of, fictional others. All of these fit with the general definition of empathy as a reaction to the observed experiences of others. PT is the most 'cognitive' of these scales, EC and PD are seen more as emotional components, whilst FS is cognitive yet also related to emotional responsiveness.

Whilst research reported above focuses on the empathic response to another, Preston and deWaal (2002) present an evolutionary model of empathy that focuses on the processes underlying empathy. The model is all encompassing, incorporating all aspects of empathy that include cognitive, emotional and behavioural responses to the perceived experiences of another, but also preceding autonomic and somatic reactions within the nervous system that are seen as automatic. Empathy is dependent upon representations; when another's state is observed, this perceived state activates the observers corresponding representations that in turn activate somatic and autonomic responses. This perspective on empathy relies on the Perception-Action Model (PAM) that presumes that perception focuses on certain elements of the environment that lead to a particular response, hence an empathic response is dependent on attention. Those objects that attract most attention are more likely to evoke empathy, such as important others (e.g., friends, peers, those that one is reliant on to attain goals, and so on). Preston and deWaal distinguish between yet integrate proximate and ultimate causes of behaviour, the former governing responses to immediate factors within the environment, the latter is responsible for evolutionary changes. For example, in a

situation where a person perceives another to be in pain, *proximity* refers to perceiving the other's state that results in an empathic response (caused by reactions within the nervous system), whilst this perception may also evoke a response because one *ultimately* may need help from that person in the future. Empathic reactions exist at both levels therefore theories that refer to one or the other are not in conflict (Preston & deWaal, 2002; see also Mayr, 1961).

A number of studies have suggested a relationship between attitudes toward animals and empathy (e.g., Furnham, McManus, & Scott, 2003; Hills, 1995; Serpell, 1996). For example, companionship from spending time with animals can lead to a sensitivity to the feelings and needs of others (Serpell, 1996). The present study examined empathy across groups of participants and in relation to their views on using animals for medical research. Previous studies have identified a link between empathy and such attitudes (Furnham, McManus, & Scott, 2003; Hills, 1995), but none have looked at this relationship with a sample of scientists and their opponents. Furthermore, whilst previous studies have identified a relationship between empathy, concern for animal well-being and humane behaviour toward animals (Broida, Tingley, Kimball, & Miele, 1993; Hills, 1995), none have included a measure of empathy specifically toward animals. The present study used the IRI (1980) and developed also a new measure of empathy that examined empathy toward animals, incorporating the four subscales from the original IRI. Hence, measured were empathy toward humans and empathy toward animals; scores from these were compared across groups. This research further develops our understanding of this relationship, since scientists and opponents of animals use can be compared on their scores for empathy toward humans and empathy toward animals. It is predicted that scientists will be more empathic toward humans (who benefit from animal use), whilst opponents will be more empathic toward animals (who suffer as a consequence of animal use).

## **Value systems**

Animals are part of social fabric, in a social, cultural and political arena of modern societies, and are of great utility to humans (Taylor & Signal, 2005). Therefore, whilst attitudes can be the product of a balanced examination of evidence, they are also influenced by other internal and external variables, such as wider value systems that are shared with and affected by our family and friends, colleagues, society, and culture (Rokeach, 1973). Values are the standards and principles that we perceive as important, expressed in behavioural dispositions, to act in a certain way in a certain situation that permits different reactions. The values that people hold are culturally embedded, are acquired through learning, communication and socialisation, and influence our ideologies, opinions and behaviour; hence they are central to attitudes as the basis for selecting and justifying actions (Kluckhohn, 1951; Rokeach, 1973; Schwartz & Bilsky, 1987, 1990; Williams, 1968). There are five formal features to values, in that they: are concepts or beliefs; pertain to desirable end states or behaviour; transcend specific situations; provide a basis to guide or evaluate behaviour and events; and are ordered by relative importance (Rokeach, 1973, 1979). Hence, they differ from attitudes in their generality, abstractness, and hierarchy of importance (Rokeach, 1973, 1979; Schwartz, 1992). There are two types of values; terminal and instrumental, the former relating to end states, phrased as nouns, for example, freedom, the latter modes of behaviour, phrased as adjectives, for example, obedient.

Rokeach (1973) identified 36 values (18 terminal, 18 instrumental), said to be universal and inclusive; these can be measured using the Value Survey. Since values are seen to have a significant influence on people's attitudes, the present research used the Value Survey in order to determine the value systems of scientists, their opponents, and laypersons. The relative importance of these for each group were examined across groups. This can increase our understanding of the



variance between these groups since different value systems may be one reason why some people can support the use of animals whilst others strongly oppose such practices. For example, opponents of animal use may rank equality as important, and therefore view animal use as an act of oppression, whilst scientists may rank wisdom as more important, and support medical research because it is viewed as a practice that can advance medical knowledge.

In the present research, factors examined in relation to attitudes towards the use of animals in medical research were: (i) perceptions of and beliefs about animals and the use of animals in medical research; (ii) empathy toward humans and empathy toward animals; and (iii) terminal and instrumental values. Between-groups differences and the relationship between these factors was of interest, in order to determine which factors best distinguish between groups. The relative strength of perceptions and beliefs concerning medical research was of also interest, which is why a ranking task was used. The main aim of this study was to determine differences between scientists involved in using animals for medical research and opponents of animal use. However, also included was a control group of laypersons; this will inform us on where the general public stand in their views and beliefs concerning the use of animals for medical research. It is predicted that, out of the three groups, scientists would be most supportive of using animals for medical research, and opponents least supportive (Hypothesis 1). Also expected was that scientists will put more value on the benefits of medical research (Hypothesis 2) and humans as superior (Hypothesis 3), opponents of animal use will put more emphasis on the costs of animal use (Hypothesis 4) and animal rights (Hypothesis 5). Also predicted was that scientists would show more empathy toward humans whilst opponents would be more empathic toward animals (Hypothesis 6), and that value systems would differ for these two groups (Hypothesis 7). The scores of laypersons are predicted

to lie somewhere in the middle of those of scientists and opponents, on all factors examined (Hypothesis 8).

## **METHOD**

### **Participants**

The total sample size was 177; 69 males and 108 females and a mean age of 31.69 (SD= 11.98). Participants were initially allocated to one of four groups based on their involvement with animal use issues. Those who referred to work involving the use of animals for medical research were allocated to the 'practicing scientist' group (n= 29), those who were students involved in using animals for scientific training/ education were referred to as 'science students' (n= 21), those involved with the Vegan Society and Compassion in World Farming were allocated to the 'opponents of animal use' group (n= 45), and those who answered 'None' to this question became the control group (n= 82).

Data screening involved examining gender, age and level of education across groups. An independent groups t-test was performed to compare 'scientists' and science students involved with animal use on their scores representing attitudes toward using animals for medical research. Analysis showed no difference between the scientists group and the science students group on this measure ( $t(48) = -.10, p > .05$ ), therefore these two groups were combined and all subsequent analysis examined scores for this new group ('scientists'), opponents of animal use, and the control. Table 7.2 shows participant details across groups, including for the scientist group, science students, and these latter two groups combined.

**Table 7.2. Participant characteristics across groups of participants**

	Laypersons (n=82)	Opponents of animal use (n=45)	Practising scientists (n=29)	Science students (n=21)	Scientists & students combined (n= 50)
Male (n=69)	44	6	12	7	19
Female (n=108)	38	39	17	14	31
Mean age	26.94	38.64	37.48	27.38	33.24
(SD)	(9.4)	(12.43)	(12.14)	(9.46)	(12.08)
Postgraduate level	32	13	25	8	33
Degree level	31	17	2	7	9
A'Level	18	10	2	6	8
GCSE/ O'level	1	4	0	0	0
No educational qualifications	0	1	0	0	0

Chi-square analyses were used to compare gender and education across the three groups, and an ANOVA was conducted to compare age.

Significant between-groups differences were found for gender ( $\chi^2$  (2, n= 177)= 19.89,  $p < .001$ ), education ( $\chi^2$  (2, n= 177)= 19.29,  $p < .01$ ), and age ( $F$  (3,185) = 11.98,  $p < .001$ ). Thus, gender, education and age were included as co-variates in later analyses.

## Design

The present study comprised three groups of participants; scientists involved in, and therefore likely to support, the use of animals in medical research, members of the organisations likely to oppose the use of animals in medical research, and a control group of laypersons not involved in the use of animals. All participants completed an online questionnaire that was advertised via websites of organisations involved with animal use issues. Examined were attitudes toward using animals in medical research (section 2), and factors that related to these attitudes. These were perceptions and beliefs concerning animals and the use of animals for medical research (section 1), empathy toward humans (section 3), empathy toward non-human animals (section 4), and terminal and

instrumental values (section 5). Factors were examined in relation to attitudes toward using animals in medical research, and scientists, opponents of animal use and the control group were compared on all variables.

### **The questionnaire**

A questionnaire was designed that measured the relative importance of perceptions and beliefs concerning animals and the use of animals for medical research, attitudes toward medical research, empathy toward humans and non-human animals, and terminal and instrumental values. Data on personal characteristics (gender, age, level of education, and animal-related work and/or hobbies) was also collected. The items used in this questionnaire are presented in Appendix VIII.

### **Section one: Perceptions and beliefs concerning animals and the use of animals in medical research**

The perceptions and beliefs proposed were: (i) whether there are alternatives to using animals ("perceptions of choice"); (ii) the relative importance of humans and animals ("humans as superior"); (iii) the benefits (for humans) of medical research ("benefits of medical research"); (iv) the rights of animals not to be used ("animal rights"); (v) whether the animals involved are capable of suffering ("belief in animal sentience"); (vi) concern for animals ("concern for animals"); and (vii) whether medical research causes suffering to the animals involved ("costs of medical research"). These are factors identified to be important predictors of using animals in medical research (see all previous studies in the present thesis). Seven statements were provided, one for each of these factors, and participants were required to rank each of these in order of their perceived importance. A score of '1' represented the issue the participant perceived to be most important, a score of '2' represented the issue perceived as second most important, and so on, with a score of '7' representing the issue they perceived as least important.

The instructions for this task were as follows:

"Below there is a list of seven issues to consider when deciding whether medical research that involves the use of (non-human) animals should be allowed. Please read this list, and think about which issues you consider to be the most important, and which are least important. The aim of this task is to allocate each of the issues a different number (from 1-8) by clicking on one of the options for each issue. So... when you have decided which issue you think is most important, click on the circle in column marked '1' next to that issue, so that there is a tick to show that you believe this to be the most important issue. Then decide which is the second most important, and click the circle in column '2'. Continue this procedure until you have filled in all eight boxes (with 1= most important, and 8= least important). If you change your mind at any time, feel free to make changes."

### **Section two: Attitudes toward the use of animals for medical research**

Attitudes toward the use of animals in medical research were measured using six statements, designed and used previously in other studies (Armstrong & Hutchins, 1996; Knight et al., 2003, 2004; Matthews & Herzog, 1997). For example: "New medical procedures should be tried on animals before they are tried on humans", and "Much of medical research done with animals is cruel". Participants responded to statements on a seven point Likert scale (from 'I disagree strongly' to 'I agree strongly').

Cronbach's alpha was found to acceptable (at .62) for these six items therefore these were grouped into one variable (representing attitudes toward medical research).

### **Section three: Empathy toward humans**

Empathy toward humans was examined using a well-respected measure of empathy, the Interpersonal Reactivity Index (IRI) (Davis, 1981). The Interpersonal Reactivity Index (IRI) (Davis, 1980) is the most commonly used and most comprehensive tool designed to measure empathy (Alterman et al., 2003). Davis proposed that empathy comprises four factor structure, each that measure quantifiably different aspects of empathy. These factors are referred to as Empathic Concern, Perspective Taking, Fantasy, and Personal Distress. This four factor structure has high internal consistency and high test-retest reliability (Davis, 1980), and correlates highly with other empathy measures (Alterman, et al., 2003).

The IRI comprises seven statements for each of the four factors (N=28), each followed by a 5-point Likert scale (from 'Does not describe me well' to 'Describes me very well'). For example: "When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me".

Cronbach's alpha was calculated for each of the four factors (Fantasy Scale= .65, Perspective Taking= .67, Empathic Concern= .62, and Personal Distress= .66) and items were grouped accordingly.

### **Section four: Empathy toward and non-human animals**

Since there is not yet a measure that examines empathic responses to animals, the present study developed new items that aimed to do this. Statements from the IRI that referred directly to humans were modified to ask the same question about animals. For example, wording of the statement "I can really get involved with the feelings of the characters in a novel" was changed to "I can really get involved with the feelings of the animals in a novel". All statements from the IRI that included a direct reference to empathy toward humans were taken and modified in this way,

resulting in a total of fifteen statements measuring empathy toward animals.

Acceptable Cronbach's alpha scores were found (Fantasy Scale= .93, Perspective Taking= .60, Empathic Concern= .64, and Personal Distress= .68), and items were grouped accordingly.

### **Section five: General life values**

Data on 18 terminal and 18 instrumental values were collected using the Value Survey (Rokeach, 1973). These values have been found to have common meaning and structure across 20 countries, and have been studied within political, religious, environmental and other domains (Schwartz, 1992). Hence, the Value Survey is proposed as a sound method to compare value priorities between groups to detect genuine variation; differences found are interpretable in light of common meanings of values.

A list of eighteen terminal values were listed, and participants were required to rank these in order, with a score of 1 representing the values perceived as most important, a score of 2 representing the second most important value, and so on, with a score of 18 representing the value perceived to be least important.

The instructions provided were as follows:

"Below there is a list of eighteen general values about life. Please read this list, and think about which you consider to be the most important, and which are least important.

The aim of this task is to allocate each of the issues a different number (from 1-18) by clicking on one of the circles alongside each value. So... when you have decided which value is most important, click on the circle

in the column marked '1' next to that value, so that there is a tick to show that you believe this to be the most important issue. Then decide which is the second most important, and click the circle in column '2'. Continue this procedure until you have filled in all eighteen boxes (with 1= most important, and 18= least important). Work slowly and think carefully. If you change your mind you can change your answers at any time."

Following this task was a page listing another 18 values (this time instrumental values). The following instruction preceded these:

"Below is another list of 18 values. Please arrange them in order of importance, as you did in the last task."

### **Pilot study**

A pilot study was conducted to test the questionnaire, in terms of ease-of-use (as perceived by participants), and to judge how long it would take to complete all tasks. Participants agreed that instructions were simple to follow, and completion was found to take on average 10-15 minutes.

### **Procedure**

The questionnaire was accessed as an online survey using a software package entitled 'surveymonkey.com'. This package allows researchers to design questionnaires that can be completed online by participants who have been provided with the URL that allow access to the website.

Participants were recruited via snowballing methods. Organisations which actively support animal use for research, and organisations which oppose animal use, were asked to advertise the present study to their members and provide the URL necessary to access the survey. These included: the Research Defence Society, the Biosciences Federation, and the Medical Research Council (all organisations that openly support the use of animals in medical research), and Compassion in World Farming and the Vegan Society (organisations that oppose animal use). A control group of mainly students was also recruited via snowballing methods, by forwarding the



URL to colleagues and asking them to forward on to their mailing lists. Participants opened the questionnaire via the internet and completed this and submitted it online. Data was downloaded directly into an Excel spreadsheet and later converted to SPSS. 362 potential participants accessed the questionnaire, but only 177 completed all tasks in full (those who did not were excluded from analyses). Data collection lasted three weeks.

## RESULTS

### **Attitudes toward the use of animals for medical research**

A one-way ANOVA was conducted to compare attitudes toward using animals for medical research across groups (i.e., scientists, opponents of animal use, and the control group), resulting in a significant effect ( $F(2,174) = 31.27, p < .001$ ). Post-hoc analysis indicated that laypersons (i.e., the control group) and scientists did not differ significantly from each other ( $p > .05$ ), but opponents of animal use were significantly less supportive of using animals for medical research than were laypersons ( $p < .001$ ) and scientists ( $p < .001$ ). Since it has been reported that sometimes differences within groups can be greater than differences between groups, it is recommended that effect sizes are now calculated in addition to the traditional model of hypothesis testing in order to determine the overlap in scores (American Psychological Association, 2001; Herzog, in press). Hence, Cohen's  $d$  was calculated to determine effect sizes, resulting in large effect sizes for scientists versus opponents of animal use ( $d = 1.52$ ) and laypersons versus opponents of animal use ( $d = 1.60$ ). Table 7.3 presents mean scores and standard deviations (with subscripts indicating where difference lie). Laypersons and scientists were significantly more supportive of using animals for medical research than were opponents of animals use.

Table 7.3. Attitudes toward animal use for medical research across groups

Laypersons	Scientists	Opponents of animal use
4.31a	4.24a	3.29b
(.82)	(.80)	(.37)

**Perceptions and beliefs concerning animals and the use of animals for medical research**

Participants were required to rank seven factors in order of importance in relation to their personal views on the use of animals for medical research. Because frequency distributions are not expected to be normally distributed with ranked data, the measure of central tendency most relevant is the median (Siegel, 1956; Rokeach, 1978). Median scores for each of the eight factors are presented in Table 7.4, together with the rank order of these medians (known as the 'composite rank order'<sup>2</sup>, or CRO) as shown in brackets. The CRO is useful for descriptive purposes as a general index of the relative position of a factor within the hierarchy of factors, and to indicate similarities and differences between groups.

Kruskal-Wallis tests (the non-parametric equivalent of a One-Way ANOVA) were conducted to compare groups on their ranking of each of the seven factors, followed by Mann-Whitney U tests for post hoc analyses. Table 7.4 includes levels of significance from the Kruskal-Wallis tests, and subscripts indicate where differences lie. Also shown are significant findings from Spearman's rho conducted in order to examine correlations between these factors and attitudes toward using animals for medical research (as discussed in the previous section). The text in bold highlights where significant differences exist.

<sup>2</sup> When more than one factor has the same CRO, the median is assigned to all such factors. For example, if two factors are ranked as most important, then the CRO becomes 1.5 (i.e., the mid-point between 1 & 2), and, as a consequence, the factor that is ranked as second most important will then have a CRO of 3.

Table 7.4. Median scores (and CROs), chi square values and Spearman's rho examining factors underlying attitudes toward using animals for medical research

	Control group	Scientists	Opponents of animal use	X <sup>2</sup>	rho
Benefits of medical research	2 (1)a	2 (1)a	<b>6 (6)b</b>	47.30**	-.54**
Animal rights	<b>6 (7)a</b>	<b>7 (7)b</b>	<b>1 (1)c</b>	56.85**	.54**
Costs of medical research	3 (2.5)a	3 (3)a	3 (2)a	.85ns	.27**
Perceptions of choice	3 (2.5)a	2.5 (2)a	<b>4 (4)b</b>	10.43*	-.59**
Concern for animals	<b>5 (5)a</b>	4 (4)b	4 (4)b	11.72*	.27**
Humans as superior	5 (5)a	6 (6)a	<b>7 (7)b</b>	14.08*	-.47**
Belief in animal sentience	5 (5)a	5 (5)a	4 (4)a	2.06ns	.30**

\* represents <.01 level of significance, \*\* represents <.001 level of significance

**Similarities between groups**

All three groups did not differ on how they ranked the importance of medical research causing suffering to the animals involved ("costs of medical research"), and whether the animals involved are capable of suffering ("belief in animal sentience"). Scientists and laypersons did not differ on how they ranked all items except "animal rights"; both groups ranked this as significantly less important than did opponents of animal use. Scientists and opponents of animal use did not differ in the way they ranked "concern for animals"; both groups ranked this item as significantly more important than did laypersons.

**Differences between groups**

The text in bold (see Table 7.4) demonstrates that the opponents present the most differences in terms of how they ranked these items. 'Benefits of medical research' and 'animal rights' were the factors that best discriminate between groups (these distinguished between opponents of

animal use from both other groups). 'Benefits of medical research' was ranked as most important by laypersons (CRO= 1) and the scientists (CRO= 1), whilst the opponents of animals use ranked this factor as unimportant (CRO= 6). For 'Animals rights' the opposite pattern emerged, with laypersons and the scientists ranking this as least important (CRO= 7 for both groups), and the opponents of animal use ranking this most important (CRO= 1).

'Perceptions of choice' was ranked as important by laypersons (CRO= 2.5) and scientists (CRO= 2), and moderately important by opponents of animal use (CRO= 4). 'Concern for animals' was ranked as less important by control group (CRO= 5) than by scientists and opponents of animal use (CRO= 4 for both groups). That is, this is . 'Humans as superior' was ranked as low in importance by laypersons (CRO= 5), scientists (CRO= 6), and opponents of animal use (CRO=7).

Significant correlations were found between all seven factors and attitudes toward using animals for medical research (see Table 7.4). The more participants supported using animals for medical research, the more importance they attached to the benefits, whether there are alternatives to using animals, and the relative importance of humans compared to animals, and the less importance they attached to animal rights, whether medical research causes suffering to animals involved, concern for the animals involved, and belief in animal sentience.

### **Empathy toward humans and animals**

Next, a MANOVA was conducted in order to compare scores for empathy toward humans and empathy toward animals across the three groups of participants. Since empathy has been found to relate to gender, gender was entered as a covariate within this analysis. Empathy measures comprised: four factors (Fantasy Scale, Perspective taking, Empathic Concern, and Personal Distress) for both empathy toward humans and

empathy towards animals, and also measures of overall empathy toward humans and overall empathy toward animals: ten dependent variables in total. Pearson's correlations were also conducted to examine correlations between empathy measures and attitudes toward using animals for medical research. Table 7.5 shows mean scores (and standard deviations), where significant between-groups differences lie, and Pearson's correlations (when significant). Text in bold indicates when one group differs significantly from both other groups.

**Table 7.5. Mean scores (and standard deviations), F values and Pearson's r for empathy toward humans and animals across groups**

	Scientists	Opponents of animal use	Control group	F	r
<b>Empathy toward humans</b>					
Fantasy Scale	3.24a (.57)	<b>2.99b</b> (.58)	3.30a (.44)	5.53**	.25***
Perspective Taking	3.52 (.48)	3.47 (.37)	3.4 (.47)	1.21ns	-
Empathic Concern	3.25 (.28)	3.21 (.29)	3.19 (.32)	.45ns	-
Personal Distress	2.80 (.45)	2.67 (.46)	2.70 (.50)	.97ns	-
Overall score (combining the four factors above)	3.20 (.29)	3.08 (.29)	3.15 (.25)	2.62*	.17*
<b>Empathy toward animals</b>					
Fantasy Scale	2.92a (1.34)	<b>3.45b</b> (1.26)	2.74a (1.05)	5.74**	-.24**
Perspective Taking	3.39a (.70)	3.47a (.54)	<b>3.04b</b> (.74)	7.36**	-.26**
Empathic Concern	2.60 (.36)	2.46 (.23)	2.62 (.37)	3.9*	-.31***
Personal Distress	2.80 (.62)	2.87 (.55)	2.70 (.55)	1.19ns	-
Overall score (combining the four factors above)	2.93a (.42)	3.06a (.41)	<b>2.77b</b> (.40)	4.34*	-.20**

\* represents  $p < .05$  level of significance, \*\* represents  $p < .01$  level of significance, \*\*\* represents  $p < .001$  level of significance

A significant multivariate effect was found ( $F(16,330) = 1.71, p < .05$ ), with main effects for empathy towards humans for the Fantasy Scale ( $F$

(2,174)= 5.53,  $p < .01$ ), and the overall empathy toward humans measure ( $F(2,174) = 2.62$ ,  $p < .05$ ), and also the empathy towards animals for the Fantasy Scale ( $F(2,174) = 5.74$ ,  $p < .01$ ), for Perspective Taking ( $F(2,174) = 7.36$ ,  $p < .01$ ), and the overall empathy toward animals measure ( $F(2,174) = 4.34$ ,  $p < .05$ ).

Post hoc analysis showed that opponents of animal use were significantly *less* empathic toward humans on the Fantasy Scale compared to scientists ( $p < .01$ ) and laypersons ( $p < .01$ ). Opponents of animal use were significantly *more* empathic toward animals on the Fantasy Scale compared to both scientists ( $p < .01$ ) and laypersons ( $p < .01$ ). Laypersons was significantly less empathic toward animals on the Perspective Taking scale and overall score compared to scientists ( $p < .01$ ) and opponents of animal use ( $p < .01$ ).

Cohen's  $d$  calculations found effect sizes to be mostly medium-large. For the *empathy toward humans* overall score (all four factors combined) the effect size was medium ( $d = .41$ ) for scientists versus opponents, and small-medium ( $d = .25$ ) for opponents versus laypersons. For the empathy toward humans Fantasy Scale the effect size was medium ( $d = .43$ ) for scientists versus opponents, and large ( $d = .60$ ) for opponents versus laypersons.

For the *empathy toward animals* overall score (all four factors combined) the effect size was small-medium ( $d = .31$ ) for scientists versus opponents, and large ( $d = .25$ ) for opponents versus laypersons. For the empathy toward animals Fantasy Scale, the effect size was medium ( $d = .41$ ) for scientists versus opponents, and large ( $d = .61$ ) for opponents versus laypersons. For the empathy toward animals Perspective Taking, the effect size was small ( $d = .13$ ) for scientists versus opponents, and large ( $d = .66$ ) for opponents versus laypersons.

Correlations showed that the more participants felt empathic toward humans (on the Fantasy Scale), the more they supported medical research, whilst the more participants felt empathy toward animals (on the Fantasy Scale, Perspective Taking and Empathic Concern), the less they supported using animals in medical research.

**Terminal values: their relative importance compared across groups**

Median scores and composite rank orders for each of the values across groups are shown in Table 7.6, as are the chi square values and p values from the Kruskal-Wallis tests conducted to compare groups. The Mann-Whitney U test was used to examine where differences lie, and Spearman's rho was used to examine correlations between terminal values and attitudes toward medical research (see Table 7.6 for results of these analyses; only significant findings are shown). Text in bold illustrates when one group differ significantly from the other two in terms of how they ranked particular terminal values.

**Table 7.6. Median scores, CROs, chi square and Spearman's rho examining terminal values across groups and in relation to attitudes toward medical research**

	Scientists	Opponents	Control group	X <sup>2</sup>	rho
A comfortable life	12 (15.5)a	<b>15 (16)b</b>	12 (14)a	9.71**	.18*
An exciting life	11 (14)a	11 (12.5)a	11 (13)a	.28	-
A sense of accomplishment	8 (6)a	<b>11 (12.5)b</b>	10 (12)a	6.24*	-
A world at peace	10.5 (13)a	<b>5 (3)b</b>	9 (9.5)a	8.34*	.21**
A world of beauty	10 (10.5)a	10 (10)a	<b>13 (15.5)b</b>	9.14**	.25**
Equality	10 (10.5)a	<b>5 (3)b</b>	9 (9.5)a	14.61***	.17*
Family security	6 (3)a	6 (6)a	5 (2)a	4.31	-
Freedom	6 (3)a	5 (3)a	<b>8 (5.5)b</b>	7.79*	.28**
Happiness	4 (1)a	4 (1)a	4 (1)a	.41	-
Inner harmony	10 (10.5)a	<b>6 (6)b</b>	8 (5.5)a	9.58**	.15*
Mature love	9 (8)a	<b>11 (12)b</b>	8 (5.5)a	7.42*	.24**
National security	15 (17)a	14 (15)a	14 (17)a	3.73	-
Pleasure	10 (10.5)a	<b>12 (14)b</b>	9 (9.5)a	8.07*	-
Salvation	18 (18)a	18 (18)a	18 (18)a	2.17	-
Self-respect	7 (5)a	6 (6)a	8 (5.5)a	3.85	-
Social recognition	12 (15.5)a	<b>16 (17)b</b>	13 (15.5)a	11.66**	.17*
True friendship	6 (3)a	<b>7 (8)b</b>	6 (3)a	4.29	-
Wisdom	8.5 (7)a	9 (9)a	9 (9.5)a	2.15	-

\* represents  $p < .05$  level of significance, \*\* represents  $p < .01$  level of significance

### Terminal values: Similarities between groups

Groups did not differ on the importance they attached to (listed in order of importance): happiness, family security, true friendship, self-respect, wisdom, an exciting life, national security, and salvation. Happiness was ranked most important by all groups (i.e., CRO= 1) and salvation was ranked least important by all groups (CRO= 18).

### Terminal values: Differences between groups

Differences between groups were evident for eleven values. The text in bold (see Table 7.6) demonstrates that the opponents of animal use differed significantly from the scientists and laypersons on the way they



ranked nine values, and laypersons differed from both other groups in the way they ranked two values. Scientists did not differ from both other groups in the way they ranked any of the eighteen values.

Scientists and opponents of animal use differed in the rank order of (listed in alphabetical order): a comfortable life, a sense of accomplishment, a world at peace, a world of beauty, equality, freedom, inner harmony, mature love, pleasure, social recognition, and true friendship. Concerning these aforementioned values, laypersons and scientists only differed on (listed in alphabetical order): a world of beauty and freedom. Laypersons also differed from opponents of animal use in terms of the importance they attached to a world of beauty and freedom, with laypersons perceiving these to be less important than the other two groups.

### **Terminal value systems and attitudes toward using animals for medical research**

Significant correlations were found between eight terminal values and attitudes toward medical research. *Less support for using animals for medical research* was associated with more importance placed on a comfortable life, a world at peace, a world of beauty, equality, freedom and inner harmony. *More support for medical research involving animals* was correlated with more importance placed on mature love and social recognition.

In summary, all three groups indicated that happiness was most important to them, and national security, social recognition and salvation least important. Laypersons and scientists were most similar in the way they ranked terminal values. They differed only in terms of how they ranked 2 of the 18 terminal values; this demonstrates that these groups share similar value systems. Scientists and laypersons differed to opponents of animal use on the way they ranked 11 of the 18 terminal values, indicating

that the value system of this latter group differs on a number of dimensions in comparison to the other two groups.

The task of ranking eighteen factors is cognitive demanding, therefore it was anticipated that those values ranked high in importance and low in importance would be most valid in terms of reflecting value systems. That is, participants would be clear on the values they perceived to be most important and those that are least important, but those values ranked somewhere in the middle would tell us little about their value systems. Therefore it was decided that only those factors ranked most important and least important (with a CRO  $<5$  or  $>14$ ) would be examined in further analyses that aims to identify those factors that discriminate between groups. A total of four factors fulfilled these criteria: a world at peace; equality; freedom; and social recognition. These were included as predictor variables in subsequent Discriminant Analysis (to be discussed later in this section).

### **Instrumental values: their relative importance compared across groups**

Kruskal-Wallis tests were conducted to compare between-groups differences, and Mann-Whitney U tests for post hoc analyses. Median scores, CROs and chi square values are shown in Table 7.7, together with significant findings only from Spearman's rho tests that examined correlations between terminal values and attitudes toward medical research. Text in bold illustrates when one group differ significantly from the other two in terms of how they ranked instrumental values.

**Table 7.7. Median scores, CROs, and chi square examining instrumental values across groups, and correlations between values and attitudes toward medical research**

	Scientists	Opponents	Control group	X <sup>2</sup>	r
Ambitious	5 (3.5)a	<b>6 (4.5)b</b>	5 (3)a	6.19*	-
Broadminded	9 (8.5)a	8 (7.5)a	11.4 (14)a	1.77	-
Capable	8 (6)a	<b>11 (13)b</b>	8 (6.5)a	10.43**	-.15*
Cheerful	17 (17.5)a	16 (17)a	16 (17.5)a	3.73	-
Clean	9.5 (10)a	<b>5 (2.5)b</b>	9 (8)a	12.64**	.21**
Courageous	10.5 (12)a	9 (9.5)a	10 (9.5)a	.67	-
Forgiving	6 (3.5)a	6 (4.5)a	7 (5)a	.02	-
Helpful	4 (1.5)a	3 (1)a	4 (1.5)a	.98	-
Honest	13 (15.5)a	15 (16)a	12 (15.5)a	1.36	-
Imaginative	11.5 (13)a	12 (15)a	11 (12)a	.85	-
Independent	9 (8.5)a	8 (7.5)a	10 (9.5)a	4.21	-
Intellectual	8.5 (7)a	10 (11)a	8 (6.5)a	1.12	-
Logical	10 (11)a	9 (9.5)a	<b>11 (12)b</b>	6.14*	-
Loving	4 (1.5)a	5 (2.5)a	4 (1.5)a	1.01	-
Obedient	17 (17.5)a	18 (18)a	16 (17.5)a	7.33	-.24**
Polite	12 (14)a	11 (13)a	11 (12)a	2.78	-
Responsible	6.5 (5)a	7 (6)a	6 (4)a	.74	-
Self-controlled	13 (15.5)a	11 (13)a	12 (15.5)a	.68	-

\* represents  $p < .05$  level of significance, \*\* represents  $p < .001$  level of significance

### **Instrumental values: Similarities between groups**

Groups did not differ on the importance they attached to (listed in order of importance): helpful, loving, forgiving, responsible, intellectual, independent, courageous, broadminded, logical, polite, imaginative, self-controlled, honest, cheerful, obedient.

### **Instrumental values: Differences between groups**

Differences between groups were evident for four of the instrumental values. The text in bold (see Table 7.7) shows that the opponents of animal use differed significantly from the scientists and laypersons in the way they ranked three values, and laypersons differed from both other

groups in the way they ranked one value. Scientists did not differ from both other groups in the way they ranked any of these values.

Laypersons and the scientist differed from opponents of animal use in the importance they attached to ambitious, capable, and clean. The former two groups perceived ambitious and capable as being significantly more important than did opponents of animals use, and perceived clean to be less important than did opponents of animal use. Laypersons differed from scientists and opponents of animal use for their ranking of logical, perceiving this to be less important than the other two groups.

### **Instrumental value systems and attitudes toward using animals for medical research**

Pearson's correlations revealed that *less support for using animals for medical research* correlated with more importance placed on being courageous, whilst *more support for medical research* was associated with more importance placed on being capable and obedient.

In summary, all three groups ranked helpful and loving as most important values, and honest, cheerful and obedient as least important. There were fewer between-groups differences for instrumental values compared to terminal values. However, differences that did emerge indicated that again, laypersons and the scientists had very similar value systems (differing only on their ranking of logical). Again, only those factors ranked most important and least important (with a CRO <5 or >14) would be examined in further analyses that aims to identify those factors that discriminate between groups. A total of two factors fulfilled these criteria: ambitious and clean. These were included as predictor variables in the Discriminant Analysis reported below.

### **Using factors identified to predict group membership**

Multiple Discriminant Analysis was conducted in order to determine which factors are most important in terms of predicting group membership.

Discriminant Analysis is sometimes referred to as a reverse MANOVA because it considers the Independent Variable (IV) as Dependent Variable (DV) and vice versa. In this case, group membership (control group, scientists, and opponents of animal use) was entered as the DV and all medical research factors that showed significant differences between groups were entered as IVs ( $n = 5$ ), as were empathy scales where between-groups differences were revealed ( $n = 3$ ), and terminal and instrumental values where between-groups differences were found (with CRO  $< 5$  or  $> 14$ ) ( $n = 4$  and  $2$ , respectively). Other factors were omitted since to include them all would require a larger sample size than this.

A total 177 cases were processed and univariate ANOVAs showed that groups differed significantly on 13 of the 14 variables ( $df_1 = 2$ ,  $df_2 = 174$ ). Standardized canonical discriminant function coefficients show the extent to which each predictor variables contribute to the ability to discriminate between groups. Table 7.8 presents ANOVA results and the coefficients for each variable, with predictors ordered by the magnitude of their contribution to Function 1.

**Table 7.8. Between-groups differences for predictor variables (ordered by the magnitude of their contribution to Function 1) and standardized canonical discriminant functions**

	Wilks' Lambda	F	Function	
			1	2
Animal rights	.65	45.88***	.79	.15
Benefits of medical research	.71	35.91***	-.70	.14
Equality	.92	7.85**	.33	.05
Humans as superior	.93	6.73**	-.29	.21
Social recognition	.94	5.50**	-.27	-.02
Perceptions of choice	.95	4.53*	-.25	-.04
World at peace	.95	4.14*	.24	-.06
Empathy toward animals (Perspective Taking)	.92	7.36**	-.15	.62
Concern for animals	.93	6.12**	.24	-.36
Freedom	.96	3.90*	.17	-.35
Empathy toward animals (Fantasy Scale)	.94	5.74**	-.25	.30
Empathy toward humans (Fantasy Scale)	.94	5.53**	.25	-.26
Ambitious	.96	3.12*	-.18	.21
Clean	.99	.42ns	-.02	.16

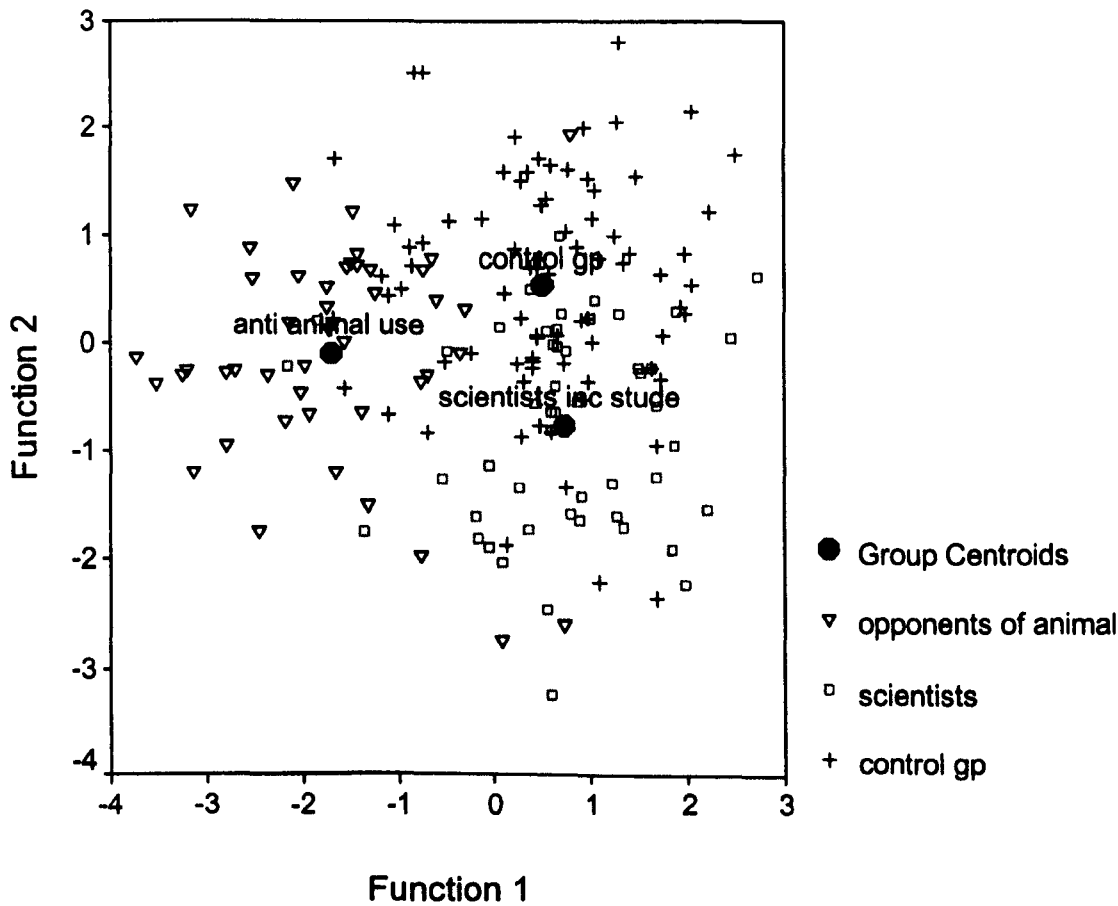
\* represents  $p < .05$  level of significance, \*\* represents  $p < .01$  level of significance, \*\*\* represents  $p < .001$  level of significance

As seen in Table 7.8, two discriminant functions emerged, with Function 1 accounting for 83.6% of the model (eigenvalue= .85) and Function 2 accounting for 16.4% (eigenvalue= .16). The functions at group centroids revealed that Function 1 discriminated the opponents of animal use from both other groups (chi square= 127.86,  $df = 30$ ,  $p < .001$ ). Function 2 discriminated laypersons from both other groups (chi square= 25.54,  $df = 14$ ,  $p < .05$ ) (see Figure 6.1). Neither function indicated scientists as a distinct group. That the most powerful function discriminated between laypersons and scientists versus the opponents of animal use reflected earlier findings that indicated that these former two groups did not often differ in terms of attitudes toward using animals for medical research and

the factors that underlie these views. That is, the views of scientists are similar to laypersons whilst those who oppose animal use are more extreme.

For Function 1, animal rights, benefits of medical research, equality, humans as superior, and social recognition were the variables that most highly discriminated between opponents of animal use and the other two groups. For Function 2, empathy toward animals (Perspective Taking), concern for animal well-being, freedom, empathy toward animals (Fantasy Scale), and empathy toward humans (Fantasy Scale) discriminated between laypersons and both other groups. Figure 6.1 presents how groups are distributed according to Discriminant Functions 1 and 2.

Figure 6.1. Group differences in relation to Function 1 and 2



Overall, the model successfully predicted 65% of the cases; 54% of laypersons, 64% of scientists, and 87% of opponents of animal use. Table 7.9 shows correct and incorrect classification of participants within groups.

Table 7.9. Correct and incorrect group classification (%) of participants

	Control group	Scientists	Opponents of animal use
Control group	53.7	29.3	17.1
Scientists	26.0	64.0	10.0
Opponents of animal use	2.2	11.1	86.7

**Predictor variables that discriminate between scientists and opponents of animal use**

Since the present study was particularly interested in differences between the views of scientists and opponents of animal use, next conducted was an additional Discriminant Analysis that excluded laypersons from analysis, in order to identify which factors best discriminate between scientists and opponents of animal use.

A total 95 cases were processed and univariate ANOVAs showed that groups differed significantly on 9 of the 14 variables ( $df_1 = 1$ ,  $df_2 = 93$ ) (see Table 7.10 for details). The discriminant function that emerged (eigenvalue= 1.56) was significant (chi square= 80.31,  $df = 15$ ,  $p < .001$ ). See Table 7.10 also for standardized canonical discriminant function coefficients for each variable, ordered by the magnitude of their contribution to function 1.



**Table 7.10. Between-groups differences for predictor variables (ordered by the magnitude of their contribution to function 1) and standardized canonical discriminant functions**

	Wilks' Lambda	F	Function 1
Animal rights	.49	95.97***	.81
Benefits of medical research	.57	69.46***	-.69
Equality	.85	16.14***	.33
Social recognition	.89	10.90**	-.27
Humans as superior	.90	10.73**	-.27
Perceptions of choice	.91	8.71**	-.24
World at peace	.93	6.99**	.22
Empathy toward animals (Fantasy Scale)	.95	4.55*	-.18
Empathy toward humans (Fantasy Scale)	.95	4.49*	.18
Concern for animals	.96	4.09ns	.17
Ambitious	.97	3.31ns	-.15
Freedom	.98	1.74ns	.11
Empathy toward animals (Perspective Taking)	1.00	.41ns	-.05
Clean	1.00	.01ns	.01

\* represents  $p < .05$  level of significance, \*\* represents  $p < .01$  level of significance, \*\*\* represents  $p < .001$  level of significance

Animal rights, benefits of medical research, equality, social recognition, humans as superior, perceptions of choice, and a world at peace were the variables that most discriminated between scientists and opponents of animal use.

Overall, the model successfully predicted 90% of the cases; 92% of scientists, and 87% of opponents of animal use. Table 7.11 shows correct and incorrect classification of participants within groups.

**Table 7.11. Correct and incorrect group classification (%) of participants**

	Scientists	Opponents of animal use
Scientists	92.00	8.00
Opponents of animal use	13.30	86.70

**Findings in relation to earlier predictions**

It was predicted that scientists would be most supportive of using animals for medical research, and opponents least supportive (Hypothesis 1). This hypothesis was supported. Hypotheses 2, 3 and 5 were also supported since scientists ranked the benefits of medical research and humans as superior as more important (compared to opponents of animal use), whilst opponents put more emphasis on animal rights. However, the costs of animal use were ranked as equally important by all three groups therefore Hypothesis 4 was rejected. In terms of measures of empathy, some support was found for Hypothesis 6 that predicted that scientists would show more empathy toward humans whilst opponents would be more empathic toward animals. However, this finding was not true for all components of empathy, hence this prediction is only partially supported. Value systems of scientists and opponents of animal use differed on a number of aspects, therefore Hypothesis 7 was supported. Hypothesis 8 predicted that the scores of laypersons would lie somewhere in the middle of those of scientists and opponents, on all factors examined. This prediction was rejected since scientists and laypersons did not differ significantly on the majority of measures examined in the present study.

Perceptions and beliefs concerning animals and medical research (animal rights, benefits of medical research, humans as superior, and perceptions of choice), and values (equality, social recognition, and a world at peace) were the variables that most discriminated between scientists and opponents of animal use. Other perceptions, beliefs and values, and some components of empathy toward humans and animals, were also found to be significant predictor variables.

## DISCUSSION

Certain people can hold extreme and passionate views concerning the use of animals for medical research, whilst others remain indifferent toward the subject. The present study aims to understand how this can be so, by exploring the source of such conflict between three groups of participants: scientists involved in animal research, opponents of animal use, and a control group of laypersons. Examined were between-groups differences on perceptions and beliefs concerning the use of animals for medical research, empathy toward humans and animals, and value systems. It was revealed that scientists and laypersons did not differ in their attitudes toward using animals for medical research; both were significantly more supportive of such practices than were opponents of animal use. Analyses supported similarity between scientists and laypersons in terms of the factors underlying these views, but differences between these and opponents of animal use. It was revealed that the most important factors to distinguish between opponents of animals use and these other two groups were belief in animal rights, the benefits of medical research, humans as superior and perceptions of choice (i.e., perceptions and beliefs concerning the use of animals for medical research), equality and social recognition (i.e., values). Scientists and laypersons ranked the benefits of animal use as the most important factor and animal rights as least important, whilst the opposite trend was observed for opponents of animal use. Also, compared to opponents of animal use, scientists and laypersons ranked humans as superior, perceptions of choice, and social recognition as more important, and equality as less important. Other perceptions, beliefs and values, and some components of empathy toward humans and animals also emerged as significant predictor variables.

So far, no research has examined such a variety of psychological factors in relation to attitudes toward the use of animals for medical research, with a sample of scientists involved with animal research, opponents of animal use, and laypersons. The present study included as participants vegans,

members of anti-vivisection groups, scientists actively involved in a range of animal use procedures, and laboratory technicians, as well as laypersons reporting no involvement with animal-related issues and practices. Results demonstrate how people can hold polarised views on the subject of animal use: opposing views on the use of animals for medical research are due to differences in perceptions and beliefs concerning the use of animals for medical research, value systems, and empathy, and the different impact that factors have on people's attitudes. Findings also show that whilst the opinions of laypersons are not dissimilar to those of scientists involved with animal research, opponents of animal use differ significantly on many measures when compared to scientists and the general public. Opponents of animal use place emphasis on animal rights, a world at peace, and equality, and less emphasis on social recognition and ambition. Scientists and laypersons place more emphasis on the benefits of medical research and the lack of alternatives to using animals. In terms of empathy toward humans, scientists and laypersons were significantly more empathic compared to opponents of animal use. In terms of empathy toward animals, both scientists and opponents were more empathic compared to laypersons. That is, in terms of the overall measure of empathy toward animals, opponents were no more empathic toward animals than were scientists. Examination of scores on the four components of empathy found further between-groups differences.

### **Benefits of medical research versus animal rights**

The two factors that distinguished most between opponents of animal use versus scientists and laypersons were belief in animal rights and the benefits of medical research; these are often used to defend opposing points of view on animal use and show that whilst similar factors may be considered by all parties, the impact of these can vary across groups. This notion is supported when we see that all three groups rank as important the costs of animal use (suffering and death to those animals involved), but that the weighting of benefits of research (for scientists and

laypersons) and animal rights (for opponents of animal use) have more impact. So, for example, scientists and laypersons do consider the costs of using animals involved in medical research, but the perceived benefits outweigh the effect of this factor and the end result is support for animal use. Previous research relating to these findings found that when defending their work, scientists focused on benefits whilst opponents focused on animal suffering (Paul, 1995), and whilst laypersons are concerned about the costs to animals associated with using animals for research, they appreciate and support the need for such practices (Gallup & Beckstead, 1988).

Darwin (1871, p.40, in Burghardt & Herzog, 1980) acknowledged that stress was inevitable for scientists involved in animal research, but later added 'unless the operation was fully justified by an increase of our knowledge'. The benefits of medical research are a popular justification and defence of those involved in such practices. This was supported by the present research whilst opponents of animal use ranked this factor as low in significance compared to other factors. Rather, this group focused on the rights of animals not to be used by humans and the costs of medical research. Animal use, especially for practices that can be linked to high value benefits for humans, presents a dilemma, as we are pulled between a compassion for animals involved in research and their 'rights', and intellectual realisation of the necessity of such practices. This paradox suggests little room for compromise between opposing parties, especially since scientists tend to deny the concept of animals deserving rights; this factor was ranked least important by scientists in the present study. Those wishing to encourage compromise between groups may need to focus on similarities such as concern for the suffering of animals used; this may be the starting point for communication between communities.

### **Perceptions of choice and humans as superior**

Other factors that emerged as important predictors of attitudes toward using animals for medical research were perceptions of choice and humans as superior. Previous research found both of these to be important predictor of attitudes, together accounting for most of the variance in people's (laypersons) views on using animals for medical research (see Study 3 of this thesis), and explaining differences between scientists and animal welfare groups (see Study 5 of this thesis). Scientists tend to perceive alternatives to using animals as rare, whilst animal welfare persons perceive such alternatives to exist, moreover, the former agreed that humans are superior to animals whilst the latter did not (see Study 5 of this thesis). The present study found that perceptions of choice was ranked less important by scientists and laypersons compared to opponents of animal use, hence not only do opposing parties disagree over whether alternatives exist or not, they also differ on the importance they attach to this factor. Humans as superior was ranked as least important compared to other factors (by all groups). This might be because scientists tend to agree that the needs of humans are more important than those of animals, but this may be an implicit assumption rather than perceived as an effective argument for their beliefs (Paul, 1995). Therefore this is a factor that distinguishes between groups, but may be less likely than other factors to be used as a justification or in defence of animal use.

### **Attitudes toward animal use and wider attitude orientations**

Some of the factors examined in the present research may relate to a wider attitude orientation or "worldview" (Buss, Craik, & Dake, 1986), such as the typology of views identified by Kellert (1980) that examines ten different perceptions of animals in relation to humans and the environment. In terms of how animals are used, opponents of animal use fit into Kellert's "moralistic" perspective on animals, that accentuates animal rights and opposes the exploitation of animals, whilst scientists are

more “utilitarian” in their views, recognising the utility of animals to benefit humans. These are prevalent views that represent two broad and conflicting dimensions, with the former opposing and the latter endorsing the utilization of animals for human benefit. Belief in humans as superior and animal rights may therefore represent a wider perspective on the human-animal relationship that impacts on attitudes and group membership, whilst other factors examined relate specifically to animals (concern for animals, belief in animal sentience) or animal use (benefits of animal use, costs of medical research, perceptions of choice). Thus, factors influencing attitudes toward animal use relate to: (i) the person (e.g., gender, personality, and a wider perspective on the role of animals in relation to humans); (ii) the animal (e.g., concern for animals, and belief in animal sentience); and (iii) the animal use (e.g., the costs and benefits involved). All such factors affect attitudes toward animal use but vary in terms of their relative impact on people’s views.

### **Values, attitudes and group membership**

Value systems tell us about the factors underlying attitudes toward animal use and group membership, and also provide more information concerning participants’ wider attitude orientations. Not only do scientists and laypersons believe in the concept of humans as superior to animals, but also they place value on social recognition and ambition (that, for scientists at least, might derive from their involvement in medical research). Opponents of animal use place more value on animal rights, and also equality, freedom, a world at peace and clean. Hence it is hardly surprising that groups can hold such opposing views on animal use in light of such findings. The value systems of scientists and laypersons were very similar, which helps explain further why their views on animal use did not differ. Saunders (2001) reports how the move toward market-driven economies in the West is leading to a “dramatic” shift in values within and across cultures. This “marketing characteristic” represents ‘homo consumens... as a total consumer... for whom *everything* becomes an

object of consumption' (Fromm, 1970, p191, from Saunders, 2001). Such a utilitarian perspective on animals may be shared between scientists and laypersons, which might explain why they share similar attitude and value systems, whilst opponents of animal use perceive animals in moralistic terms as deserving rights. This supports our previous suggestion relating the findings of the present study with "moralistic" and "utilitarian" attitude typologies (Kellert, 1980).

The present research found correlations between attitudes toward medical research and a number of terminal and instrumental values. Also found were between-groups differences in the way scientists and laypersons versus opponents of animal use ranked many of the factors. These findings suggest a relationship between values, attitudes toward the use of animals for medical research, and group membership. Discriminant analysis revealed that the values that best discriminated between groups were social recognition, ambition, equality, a world at peace, freedom, and (to a very small extent) clean. Scientists and laypersons ranked social recognition and ambition as important than opponents of animal use, opponents of animal use ranked equality and a world at peace as more important than scientists and the control. These differences support the idea of different wider orientations underlying attitudes; that scientists and laypersons value social recognition and ambition whilst opponents of animal use value equality and world peace indicate very different ways of looking at the world. However, there were also similarities in the value systems of scientists, laypersons and opponents of animal use, since groups did not differ on their value systems in terms of how they ranked a number of factors. For example, all three groups ranked family security, happiness, and self-respect as important life values, and an exciting life, national security, and salvation as least important. Hence, whilst there is conflict between groups concerning their views on animal use, there is some overlap in the value systems of such groups.



### **Attitudes toward animal use and integrative complexity**

Animal use clearly presents a conflict in terms of value for both human and animal well-being. When thinking about such issues, people can consider human-related factors, animal-related factors, or both. Such styles of thinking has been examined and used to explain differences between people with opposing views on subjects such as politics and slavery, with a focus on the way in which people process information (Tetlock, 1984; Tetlock, Armor, & Peterson, 1994). Integrative complexity refers to a style of reasoning that requires organising and differentiating information; the higher the integrative complexity, the more sophisticated a persons cognitive style, in terms of making distinctions between things and ideas (differentiation), whilst also seeing more connections between such factors (integration). Integrative complexity comprises two cognitive attributes; evaluation differentiation and conceptual integration. The former refers to openness of evaluation, the second to the integration of more than one perspective. The complex thinker is more evaluative differentiated, accepting that more than one point of views exists, and is able to weigh up and integrate a number of relevant factors. The more simple thinker is more rigid, perceiving issues in black and white and denying other perspectives, and is therefore unable to integrate a range of factors that might be relevant (McAdams, 2000; Suedfeld & Leighton, 2002; Tetlock, et al., 1994).

Tetlock (1984) found that equality and freedom are two values that often conflict; therefore a more complex ideology may be necessary to accommodate both. The present research found that opponents of animal use integrate both of these into their value systems, ranking both as important, whilst scientists and laypersons ranked freedom as more important than equality. If we take Tetlock's perspective on integrative complexity this indicates that opponents of animal use hold a more complex ideology than do other groups examined in the present study. However, integrative complexity is necessary for both scientists and

opponents, since the issue for using animals for medical research requires the integration of opposing but important values, perceptions and beliefs that are brought into conflict; in this case, on the one hand factors such as freedom, equality, and animal rights, and on the other hand utility in terms of the benefits of research, and the belief in humans as superior and social recognition. Other research has showed that scientists and animal rights supporters do have an adequate understanding of their opponents point of view (Kemdal & Montgomery, 2001; Paul, 1995), indicating that both groups are complex thinkers. Both groups seem to have integrated conflicting factors but reached a firm stance regarding animal use; this is possible due to the different weightings given to such factors. In relation to animal use practices, scientists perceive human interests as more important, whilst opponents perceive animal rights to be more important. As mentioned earlier, concern for animal suffering, shared by scientists and opponents of animal use, may be the starting point for discussion between these parties. However, both must be prepared to concede on issues they feel strongly about if the debate is to move forward toward compromise.

### **Differences in empathy toward humans and animals**

Whilst it is widely believed that promoting caring attitudes toward animals will extend to humans and a generally humane outlook on life, promoting concern toward animals has been less successful than hoped (Ascione, 1992). This may be due to our lack of understanding of the processes that underlie the relationship between empathy and attitudes toward how we treat animals. The present study gives an indication of the complexity of this relationship, resulting in both explicable and unexpected findings according to the different components of empathy. Several between-groups differences on measures of empathy were found. Compared to scientists and the control, opponents were significantly less empathic toward humans on the Fantasy Scale, whilst the latter were significantly *more* empathic toward animals on the Fantasy Scale. The Fantasy Scale

is cognitive but relates to emotional responses and represents identification with, and imagining oneself as in the place of, fictional others. Hence, findings indicate that scientists do this more easily when referring to other humans, whilst opponents of animal use are more inclined to imagine themselves in the place of an animal.

That scientists and laypersons were more empathic toward humans whilst opponents of animal use were more empathic toward animals (on the Fantasy Scale at least) was not surprising. This helps explain why support for animals use was high for the former two groups and lower for the latter. However, for overall scores (all four factors combined) for empathy toward humans and empathy toward animals the picture was more complex. Scientists and laypersons were significantly more empathic toward humans compared to opponents of animal use, whilst opponents were significantly more empathic toward animals compared to laypersons *but not compared to scientists*. That is, in general scientists do not seem to be significantly less empathic toward animal compared to opponents of animal use. (In fact, laypersons were the group that were least empathic toward animals.) The perception-action process that is proposed to underlie empathy is dependent upon the observer in some way identifying with the observed other, therefore it is suggested that humans to some extent need to anthropomorphise animals if an empathic response is to occur (Preston & deWaal, 2002). It may be that those who are more involved with animals (in this case, scientists and opponents of animal use) are more likely to identify with animals than laypersons, which would explain why in the present study they were found to present higher levels of empathy toward animals compared to laypersons.

That empathy toward animals did not differ between scientists and opponents of animal use indicates that this factor is not a strong determinant of attitudes toward animal use. That is, experiencing an empathic response to the plight of research animals does not deter

scientists from continuing with their research, probably because they are more focused on the benefits of their work and recognise that animals are an integral part of this. However, that opponents of animal use were significantly less empathic toward humans might indicate one reason why this group is strongly opposed to animal use. Because they don't empathise as strongly with humans, the benefits of medical research do not become a justification for animal use as they do for scientists and laypersons. This is supported by results of the ranking task that found opponents of animal use ranked benefits as least important whilst both other groups ranked benefits as most important. Hence, for scientists it may be that empathy toward animals is modified by the perceived utility of animals, whilst for opponents of animal use it is not. Serpell (2004) identified two independent but interacting components to attitudes toward animals; affect (emotional response to animals), and utility (instrumental value of animals). Affect and utility are baseline descriptions of attitudes that only account for a certain amount of the variance; attitudes are dependent upon other extrinsic and intrinsic factors referred to as attitude modifiers. That is, opinions concerning animals can be modified by human attributes (e.g. gender, age, experience), animal attributes (e.g., physical characteristics, mental abilities), and cultural factors (e.g., history, values). Empathy toward animals is likely to be influenced by such modifiers, thus although levels of empathy toward both humans and animals do vary between groups, such factors might play only a small role in people's attitudes toward animal use. Discriminant analyses in the present study support this notion, indicating that empathy measures accounted for a significant but small amount of variance in attitudes compared to other factors such as perceptions and beliefs concerning the use of animals for medical research and values.

### **Limitations of the present research**

Limitations of the present study include those endemic to all ranking tasks that comprise approximately seven or more items in terms of inherent

cognitive limitations. Future research may use Likert scales, randomise order of items to be ranked, or require participants to rank a smaller number of factors that are of particular interest. However, the advantage of these ranking tasks was that it required participants to compare the importance of items. Hence, data from these tasks illustrated the *relative* importance of items, resulting in particularly interesting findings that Likert scales cannot provide.

Another limitation may relate to recruitment procedures. Participants participated via an online survey; this may have influenced our findings in terms of the kind of person most likely to take part in such studies. However, this method was a fast and efficient way of collecting data, and may not affect data any more than other more commonly used methods such as convenience or opportunity sampling.

### **Directions for future research**

#### ***Opposing attitudes toward animal use***

The present study extends our understanding of why people hold opposing attitudes toward the use of animals for medical research, and also provides many avenues for further exploration. For example, future research may examine the attitudes of laypersons toward scientists and groups that oppose animal use. Research on public attitudes can inform public debate (Furnham & Heyes, 1993), policy and practice (Nuffield Council on Bioethics, 2005). The little available research examining the public's view of scientists and animal rights groups has led to mixed findings. For example Feeney (1987) suggested that the public, the media, and students are often hostile toward the scientific community involved with animal research, whilst other polls have indicated that many people do support the use of animals in research even when this causes distress, pain and death to the animals involved (The National Science Foundation, 1991, in Baldwin, 1993). Clearly more research is needed that examines how different sections of society (e.g., scientists, opposing groups, and

laypersons) perceive each other. This could help scientists and opponents of animal use understand how they are perceived by the public, and may also provide opposing groups with a starting point for discussion with an aim to reducing conflict between such parties. Styles of reasoning could also be examined, since if opposing groups demonstrate integrative complexity, this indicates room for compromise. However, this will depend upon how extreme people's views are on a topic. If opponents of animals use believe in animal rights for all animals in all situations, and scientists stress that all science is good, then compromise is doomed to fail, since resolution is attempting to reconcile the irreconcilable.

### ***Empathy and attitudes toward animal use***

Research is also needed to further explore the relationship between empathy and attitudes toward animal use. For whilst the relationship between the views of opposing parties and their perceptions and beliefs concerning medical research is fairly straightforward, the relationship between attitudes and empathy is more complex. Research needs to further investigate the relationship between empathy and attitudes toward animal use, by examining empathy specifically toward humans and specifically toward animals for each the four components of empathy. The present study led to predictable findings in terms of empathy toward humans and animals, but also revealed surprising results: whilst there does appear to be an association between empathy and views on animal use, this relationship is complex and the current findings suggest the relation may be weak. In fact, whilst researchers do recognise this relationship, others have begun to question its' strength (Ascione, 1992). Since this is the first study that has used separate measures to examine individual components of empathy toward humans and animals, similar research in this area is now needed.

### ***Values and styles of thinking***

Future research may examine moral reasoning and ways in which people think about and process information, to determine whether scientists, laypersons and opponents of animal use differ on such factors. Moral reasoning at the highest level refers to the ability to see opposing perspectives on an issue and integrate arguments and reasoning, whilst also accepting the need for universal principles of justice that respect the fundamental equality and liberty of persons (Tetlock et al., 1994).

Comparing the present research to the findings of Tetlock' study of attitudes toward slavery indicate similarities between radical abolitionists, in terms of their views on human rights, and opponents of animal use, in their views on animal rights. The moral norm-activation theory assumes that altruistic behaviour (e.g., defending animal rights) is activated by personal moral norms based on the belief that certain conditions threaten the well-being of others. Moral reasoning may differ between scientists and their opponents in that opponents might believe that it is morally wrong to use animals for the benefit of humans, especially if this causes distress to those animals involved. Scientists, however, might believe that if there is a chance of medical progress, such as the development of cures, vaccinations and medical procedures that can reduce human illness and suffering, then it is morally wrong not to continue with such practices, even if they do entail suffering and death for animals involved. Future research may examine moral reasoning and styles of thinking across opposing groups in order to further understand polarised views on animal use. For example, content analysis or discourse analysis could be applied to the literature that promotes, defends or criticises animal use.

### **Conclusions**

Belief in the value of science and the potential of animals to suffer, results in a challenging and uncomfortable position (Paul, 1995). When people are thinking about their view toward an attitude object they have to consider a number of factors, but emotions and cognitions can have

varying degrees of impact on the attitudes of different individuals (Breckler & Wiggins, 1989), so that different people attach different weighting to factors that influence their attitudes (Ajzen, 1991). The present research examines and supports this notion and shows how complex thinking that represents integrative complexity is demonstrated by parties that hold opposing views on animal use issues. By placing different weighting of either human interests (as viewed by scientists) and animal interests (as viewed by opponents of animal use), both parties can have a fair understanding of all issues and integrate conflicting issues, yet hold opposing views on the same topic; that of using animals for medical research. This research significantly contributes to the field of human-animal relations, and can inform those interested in the structure, nature and variance in attitudes toward animal use.



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## **CHAPTER 8**

### **ATTITUDES TOWARD ANIMAL USE: SUMMARY AND GENERAL DISCUSSION**

This PhD project aimed to examine the basis and nature of attitudes toward animal use with two overarching research questions in mind: Why do individuals seem to hold disparate views on animal use? And why do different people have opposing views on animal use? The first of these questions refers to within-subjects differences, the second to between-subjects differences. It was proposed that the identification of key factors that underlie attitudes toward animal use might provide the method and mechanism to answer these questions. A review of existing literature on this topic indicated that previous research has mostly focused on participant characteristics such as gender and personality in order to explain variance in people's views. Together these variables account for a significant, but small, amount of the variance (up to 10%) (Driscoll, 1992). Instead, the present thesis set out to explore alternative ways of understanding attitudes toward animal use, acknowledging yet moving away from a focus on the relationship between attitudes and personal characteristics. Comprising a series of six studies, examined were perceptions and beliefs (i.e., psychological variables) concerning animals and animal use. Findings from these studies demonstrate that these account for large amounts of the variance in attitudes toward animal use (up to 62%), considerably more than do participant variables such as gender and personality. Hence, whilst personal characteristics do play a role in people's views on animal use, a person's perceptions and beliefs concerning animals and animal use have more impact on how they feel about animal use practices. The present project demonstrates how psychological factors can explain both within-subjects and between-subjects differences in attitudes toward animal use. This is highly relevant since previous research has not recognised the importance of psychological factors when examining attitudes toward animal use. These

findings have important implications and will appeal to various communities, such as scientists wishing to engage laypersons and gain support for their work, animal welfare persons, academics interested in attitudes and attitude change, and those involved in decisions concerning animal use policies and practice.

### **Main findings from the present project**

This PhD project further contributes to this field of research in a number of ways. In the first study it was demonstrated that attitudes toward animal use are not uni-dimensional as previous research had suggested; people's views vary according to the different ways in which animals are used. Furthermore, belief in animal mind, people's beliefs concerning the mental experiences of animals, was the strongest predictor of attitudes toward animal use, accounting for considerably more variance in attitudes than personal characteristics. The second study in this thesis used qualitative methods to identify other perceptions and beliefs concerning animals and animal use. Attitudes toward animals, analysis of the costs and benefits of animal use ("cost-benefit analysis"), the perceived existence of alternatives to using animals ("perceptions of choice"), and knowledge of animal use procedures emerged as central factors underlying attitudes toward animal use, together with several seemingly less central factors. All such factors were examined in the third study that involved the development of a questionnaire that could provide quantitative evidence for these. Findings demonstrated that factors explained why attitudes vary depending upon the type of animal use in question. Perceptions of choice was shown to be the most important predictor of attitudes toward the use of animals for medical research, dissection and personal decoration. This factor alone accounted for 46% of the variance in attitudes toward the use of animals for medical research. Consequently, perceptions became the focus of Study 4, this study revealing that informing people that there are alternatives to using animals for medical research led to significantly lower levels of support for using animals for such purposes. That is, a causal

relationship between perceptions of choice and attitudes toward animal use was confirmed. This finding will be of interest to those interested in attitudes toward animal use, and those interested in attitudes in general. It tells us that attitudes can be changed and provides a method for doing so, and thus has important implications for those wishing to persuade people to support a particular view on animal use issues.

The first four studies in the present thesis have included laypersons (Studies 1-3) and students (Study 4). In the final two studies of this project, people involved in animal use issues participated: scientists, animal welfare persons, and a control group of laypersons. There is little existing empirical research that informs on the attitudes and beliefs of such groups, in particular scientists involved in animal use. Studies 5 and 6 provide a considerable amount of data that demonstrates how such groups think about animals and animal use issues. Study 5 focused on the in-depth examination of belief in animal mind across groups and in relation to attitudes toward animal use. A sophisticated measure of belief in animal mind enabled between-groups comparisons for belief in animal cognition, belief in animal sentience, and belief in animal mind for different types of animal in relation to the phylogenetic scale. Findings showed significant differences between scientists and animal welfare persons on all measures. Belief in animal mind, together with perceptions of choice and belief in humans as superior to animals, explained the variance in attitudes toward animal use. However, all groups believed in animal sentience and cognition for a number of different kinds of animals, and all groups rated different types of animals in a way that reflected the phylogenetic scale. Also revealed was that scientists were not supportive of animal use in general, they were either neutral or opposed to using animals for purposes other than for medical research. In fact, animal welfare persons tended to present more extreme views compared to laypersons than did the scientists.



Study 6 examined factors underlying attitudes toward the use of animals for medical research with scientists, opponents of animal use and a control group of laypersons. A ranking task was used in order to identify the relative weighting of each of the psychological factors identified in previous studies in relation to attitudes toward animal use. Also examined was the role of empathy (toward humans and animals) and the value systems of participants. Findings were similar to Study 5 in that the views of laypersons were not generally different to scientists, nor were measures of empathy and value systems. The factors that best distinguished between groups were belief in animal rights and the benefits of animal use. Scientists and laypersons ranked the former as least important and the latter as most important, whilst for opponents of animal use the opposite trend was revealed. Study 6 also generated detailed information concerning empathy toward humans and empathy toward animals, beyond what is already known in this field. Empathy plays a significant but small role in people's attitudes toward animal use and distinguish between scientists and their opponents, as do particular values such as equality and social recognition.

### **Explaining different attitudes toward animal use**

The present project has identified a number of perceptions and beliefs concerning animals and animal use. All of these factors represent underlying psychological mechanisms that relate to the ways in which people feel about particular animal use practices. Different people hold different perceptions and beliefs concerning animals and animal use, which is why people can consider similar factors when thinking about their views on an issue, yet continue to hold opposing positions on the same topic. For example, a scientist may perceive there to be no viable alternatives to using animals for medical research, whilst their opponents may perceive alternatives to exist. As a consequence each reach a different decision on the acceptability of animal use. Moreover, since perceptions and beliefs can vary depending upon the particular type of

animal use in question, so can attitudes vary. For example, when people consider their views on the use of animals for medical research, the benefits of these are likely to be at the forefront of their thinking. If these practices are believed to result in high-value benefits such as finding a cure for serious diseases, then support for medical research is likely to be high. However, when considering practices involving the use of animals for personal decoration, the benefits are less obvious and hence support will be low. (But of course such a scenario may not be true if a person is involved in, and likely to profit from, the use of animal use for personal decoration.)

Attitudes toward animal use are clearly context-specific. Whilst attitudes may appear uni-dimensional, in that a person may be generally for, against, or indifferent about animal use, when they consider their point-of-view, specific details will influence that person. And since details will differ for different contexts, so will their attitudes. This is why people can appear to hold disparate views on the subject of animal use. For example, a person may be generally supportive of using animals for medical research. But if we present them with a scenario such as:

'Dalmatian dogs are being used to test a drug to treat cataracts. The testing procedures cause blindness in the dogs but have led to positive findings for a cure.'

A person's attitude toward this scenario will depend on personal characteristics such as whether they are male or female, and whether they themselves (or someone they know) has suffered with cataracts, and they will also be influenced by their perceptions and beliefs concerning the animal and the animal use. For instance, their experience of Dalmatian dogs, whether they believe in animal rights, their affection for these types of dogs, their belief in animal mind for Dalmatians dogs, whether they perceive there to be alternatives to testing on animals, and so on. All such

information can affect their view, yet if one detail was to change (e.g., Spaniels dogs were being used), their view might also change. This answers the question of why people can appear to have disparate views on the subject of animal use. Furthermore, different people may attach different weighting to certain factors, and therefore reach difference conclusions. So, for example, a scientist may focus on the benefits of finding a cure for cataracts and the fact that there is no alternative but to test on dogs, whereas an animal welfare person may focus on the concept of animal rights, the cost of causing blindness in these dogs, and their affection for dogs. Thus, these two people consider the same information but reach opposing opinions about the scenario due to the different weighting that factors have on their views.

Hence it is not that people believe in incompatibles, more that our views are influenced by a number of factors (that interact and sometimes act as moderators on each other), so that it looks this way. A person may perceive there to be no viable alternative to using animals to test new drugs, nor for teaching anatomy via animal dissection (i.e., perceptions of choice is similar for the two contexts). However, the perceived benefits of these two practices may differ; if for medical research the benefits are perceived as high, whereas for dissection they are not, then the former will be supported, whilst the latter will not. Furthermore, the relative impact of factors on attitudes varies from person-to-person, and from context-to-context. So, for example, an animal welfare person might focus on the pain and suffering caused to animals used for medical research, and consequently oppose such practices, whilst a doctor might believe the reduction of human suffering to be more important than animal welfare concerns, and therefore support animal use. This is not to say that a doctor does not feel concern for animals, nor that an animal welfare person is not concerned with human suffering, but that each puts more weighting on different factors when considering the rights and wrongs of animal use.

**Main factors underlying attitudes toward animal use: A summary**

People have different views toward animal use because their attitudes are influenced by a complex combination of factors. These factors are personal factors (such as gender, personality, and so on), perceptions (such as the perceived costs and benefits of animal use, and perceptions of choice), and beliefs (such as belief in animal mind and humans being superior to animals). As people vary in terms of gender, personality and so on, so do perceptions and beliefs. These can be affected by outside influences specific to the individual such as group membership, parental attitudes, societal norms and so on. Thus, attitudes toward animal use are affected by a range of factors that might include, for example, a person's belief in animal rights, their gender, their peers, the type of animal involved, etc.. This explains how people have such broad and contrasting views on the use of animals, in terms of both within-subjects and between-subjects differences. Table 8.1 presents a summary of the factors that most underlie attitudes toward animal use. These factors can vary in terms of strength of impact on attitudes, depending upon the person and the type of animal use in question.

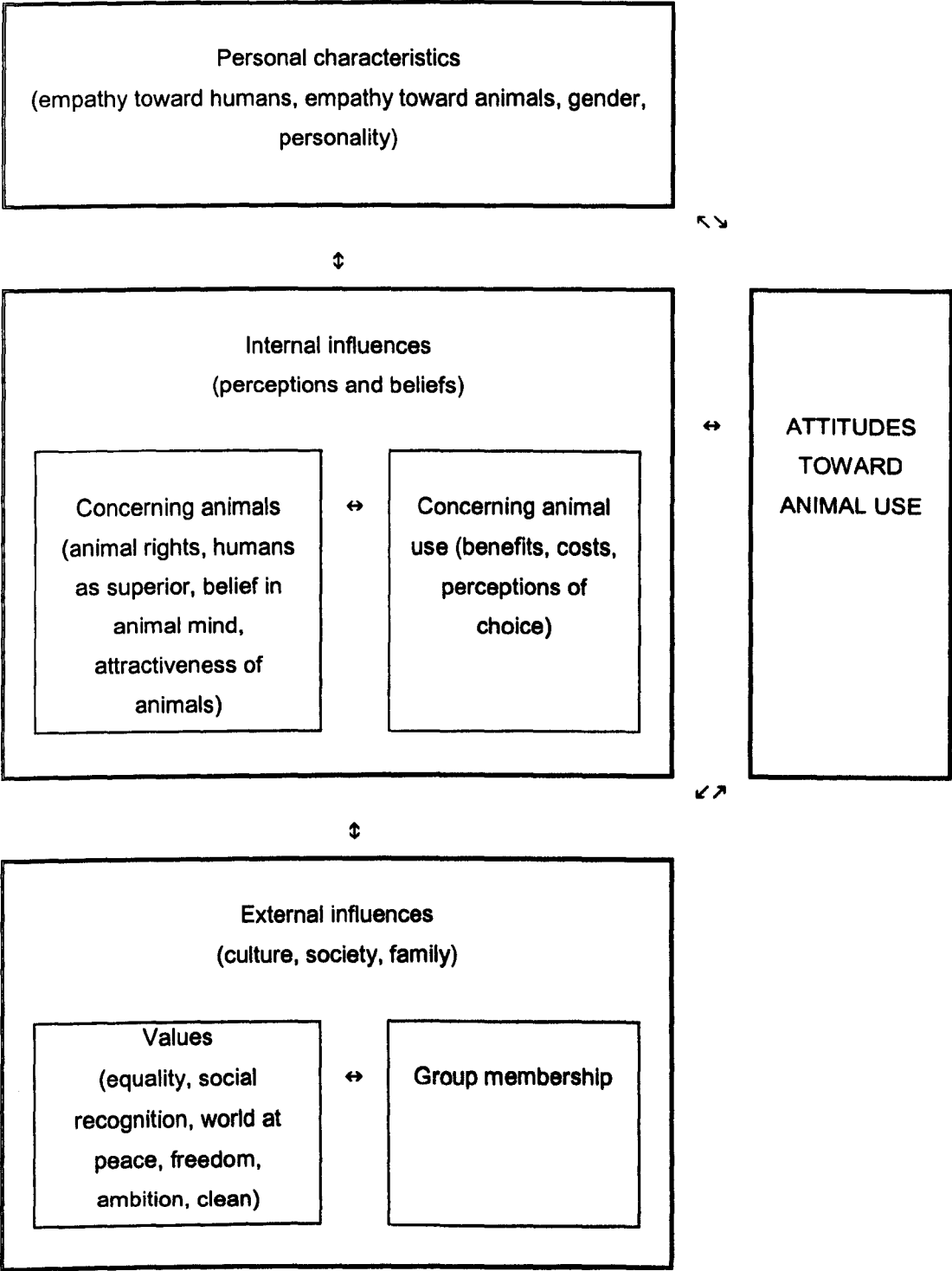
**Table 8.1. Factors that underlie attitudes toward animal use**

Personal characteristics	Gender, personality
	Empathy toward humans, empathy toward animals
Psychological factors (perceptions and beliefs)	Concerning animal use (benefits, costs, perceptions of choice)
	Concerning animals (animal rights, humans as superior, belief in animal mind, attractiveness of animals)
Outside influences (culture, society, family, significant others, society, culture)	Group membership
	Values (equality, social recognition, world at peace, freedom, ambition, clean)

It is important to note that the relationship between these factors and people's views is fluid. Figure 8.1 provides a representation of how this relationship might be presented visually. The variety of factors that can impact on people's attitudes, and the ways in which these factors can

interact, makes intra- and inter- individual and group differences hardly surprising. Attitudes differ in direction and intensity based on combinations of factors as reported here. Figure 8.1 reflects certain ideas presented in Serpell's (2004) research that describes attitudes toward animals and demonstrates how such attitudes are influenced by 'attitude modifiers'. Serpell reported affect (toward animals) and utility (of animals) to be the baseline components of attitudes that are dependent upon modifiers that can moderate/ mediate orientations. Modifiers are animal attributes (the physical and psychological characteristics of animals), person attributes (such as a person's gender, age, and so on), and cultural factors (science, history, cultural/ religious beliefs and values, culturally defined practices, and cultural representations). Figure 8.1 is not dissimilar to Serpell's model, but refers more specifically to attitudes toward the use of animals and therefore also incorporates perceptions and beliefs concerning animal use practices. It is proposed that the model (Fig. 8.1) is all encompassing; it includes all factors that are likely to have a *substantial* impact on attitudes toward animal use.

Figure 8.1. Inter-relating factors that most influence attitudes toward animal use



**Future directions for research on attitudes toward animal use**

Serpell (2004), who presented a model of human attitudes toward animals, stressed the need for a model that addresses attitudes toward animal use. Figure 1 provides a graphical description of the relationship between attitudes toward animal use and the factors underlying these views. However, since this model is largely hypothetical it must now be tested. Serpell proposed that his model should be tested in order to confirm general validity and determine whether dimensions can be reliably measured; the same recommendations are applicable to Figure 1. Future research that tests this model will provide better understanding of attitudes toward animal use. Furthermore, the factors that underlie attitudes, the relationships between these, and their impact on people's views might vary depending upon the type of animal use. Future research in this area might explore such variance and also examine the basis and nature of attitudes toward the use of animals for food. This subject was not explored within the present research project, yet animal husbandry is becoming a "hot" topic for animal rights supporters.

Researchers interested in attitudes toward animal use may take the findings from the present project one step further by examining the relationship between the factors examined in the present project, attitudes, and behaviour. This project has focused on attitudes rather than behaviour, although we may make some predictions in light of the latter two studies that examine those involved in animal use issues. If we take such involvement (i.e., group membership) as a measure of behaviour, then we might imply that the factors identified may be antecedents of actions that support or oppose animal use. For example, Study 6 indicated that belief in animal rights and the benefits of medical research as the two factors that best predict group membership, for scientists and opponents of animal use. Other factors such as belief in equality, humans as superior, social recognition, and perceptions of choice are also significant predictors of group membership. Measures of behaviour that future

studies might consider include donating monies to animal welfare organizations or charities that support the use of animals for medical research, working in animal use industries, or participating in sports that involve the use of animals.

Research may also use the findings from this project to explore ways in which conflict might be reduced between scientists and their opponents. Since each group holds a number of opposing perceptions and beliefs and value systems, it is unlikely that either party is likely to be persuaded to change their general opinions on animal use. However, compromise between groups may be the way forward with a focus on similarities between groups as a starting point. For example, Study 6 indicated that scientists, opponents of animal use, and laypersons were all equally concerned with the costs of animal use ('whether medical research causes suffering to the animals involved'), hence this concern shared by different groups could provide the basis of communication between these parties. If both parties are concerned about animal suffering then animal welfare groups need to persuade scientists and laypersons that: suffering is caused to animals, and / or that suffering cannot be justified, and / or that suffering can be reduced or eliminated. Communication on this level provides more chance of success in terms of conflict resolution if both sides are prepared to focus on external attributes (in this case, the issues in hand) rather than internal attributes such as the personal characteristics of group members (see Kemdal & Montgomery, 2001, for a discussion of internal and external attributes concerning animal use). Plous (1998) claimed that there is room for dialogue between activists and scientists, proposing a 'peace plan' to reduce conflict between groups. Scientists and animal rights activists were shown this plan and both parties did show support for some of its components. For example, animal rights supporters claimed that if scientists agreed to stop portraying them as terrorists, then they would agree to condemn violent forms of activism. Furthermore, the latter need to accept that research does lead to benefits for humans (and



animals), whilst scientists need to accept that if animals are close enough to humans that they are valid models for human conditions, then they deserve ethical consideration (Gregory, 2000). Communication between groups based on their concern for animals may be the starting point for compromise between opposing parties.

Future research interested in between-groups conflict may examine the integrative complexity (IC) of arguments presented by scientists and opponents of animal use since low IC leads to conflict; for example, declining IC in diplomatic communities in crisis is a lead indicator of war (Tetlock, 1984; Tetlock, Armor & Peterson, 1994). Complex thinkers are able to consider multiple perspectives on an issue and are therefore better equipped to work toward conflict resolution that incorporates compromise and satisfies opposing parties to a certain extent. Conversely, less complex thinkers tend to focus on their own point-of-view and deny that disparate perspectives might be valid. Hence simple IC is more likely to result in conflict, since neither side can see their opponent's view there is no room for compromise. Existing research has demonstrated that scientists and their opponents do have a fair understanding of their opponents point-of-view (Kemdal & Montgomery, 2001; Paul, 1995). This indicates that such parties are complex thinkers and hence that there may be room for communication and compromise. Further research in this area could analyse the literature presented by such groups in order to examine the integrative complexity of the arguments proposed. This would provide insight into the potential for conflict resolution between opposing parties concerning the issue of animal use.

### **Methodological considerations for future research in this field**

The present research began by examining attitudes toward a number of animal uses in a broad sense, but became more narrow by ending with a study that focused on attitudes toward only one type of animal use in particular. Future research might choose to be even more specific; they

might, for instance, examine attitudes towards using dogs for medical research. Questions could then ask question relating to a range of aspects concerning the use of a range of different species of dogs and look at a range of different aspects concerning medical research. Alternatively, a multi-method approach that examines the same subject from a number of angles, as used in this thesis, can provide verification of findings. Finally, whilst the findings presented in this thesis provide many directions for future studies, the complexity of attitudes toward animal use and the factors that underlie these views (as presented in Fig. 8.1) makes research difficult to operationalise. Hence it may be most appropriate to focus on a small number of the most relevant factors, and the relationship between these, to develop our understanding further.

The present project reports the basis and nature of attitudes toward animal use in largely British samples. These may be specific to this particular population, hence future research may consider making cross-cultural comparisons. Opposition to animal use is higher in Great Britain, France and Belgium, and lower in the US and Japan (Herzog, et al., 2001; Pifer, Shimizu & Pifer, 1994). Since attitudes do differ across countries and cultures, so might factors underlying these views. At present there is no research that examines the psychological underpinnings of attitudes within other countries and cultures, therefore we recommend that future research study the factors identified within this thesis with samples that are not largely British. Future research could also include younger participants, in order to determine how children develop and maintain attitudes toward animal use. The potential to manipulate perceptions of choice in order to change children's attitudes might also be examined, as well as the potential to manipulate other perceptions and beliefs concerning animal use in order to determine a causal relationship between other such factors and people's views. Such studies are needed in order to explore this relationship with both adult and child samples.

Whilst a link between empathy and the treatment of animals has been suggested, previous research has tended to use a general measure of empathy that focuses on empathy toward humans (i.e., the Davis, 1980, IRI scale), rather than empathy specifically toward animals. Study 6 of the present project developed such a scale comprising four components that reflect those in the IRI scale to measure empathy toward animals.

Findings from this study demonstrated that whilst there is a relationship between empathy toward humans, empathy toward animals, and attitudes toward animal use, the relationship is complex; some components of empathy correlated with attitudes, whilst others did not. Also, between-groups differences showed that some people are empathic toward humans whilst others are more empathic toward animals. Hence, future research needs to distinguish between empathy toward humans and empathy toward animals, and examine the relationship between these and attitudes toward animal use further.

### **Implications of the present research**

The research studies in this thesis fit within a Social Cognition Theory (SCT) framework. SCT examines how people think about and interact with their world, proposing that individuals actively construct reality as a result of cognitive processing and social interaction (Bandura, 1997; Fiske & Taylor, 1991; Stone, 1998). People's thoughts and behaviour are determined by both personal factors (cognitive, affective and behavioural) and environmental factors. Behaviour, personal and environmental factors are constantly interacting. This interaction is triadic, dynamic and reciprocal. The present research takes this perspective; people's attitudes toward animal use will be influenced by a range of factors that a person's perceptions and beliefs, their gender, personality, environment, and so on, all of which will interact and vary in strength depending upon the individual and the situation. Those wishing to understand and perhaps influence people's attitudes need to understand the fundamental determinants of these views. A social-psychological framework provides considerable

potential to advance academic and practical understanding of what people think, how people think, and how they may be persuaded to think otherwise.

The studies in this thesis and the model presented above provide support for Social Cognition Theory (SCT), by demonstrating that attitudes and group membership (as a potential measure of behaviour) are determined by a number of factors that interact and impact on each other. As suggested as possible within a SCT framework (Bandura, 1997), the research studies included in this thesis demonstrate how attitudes can be acquired and maintained, whilst also providing a basis for prediction and possible intervention. The Theory of Planned Behaviour (TPB) (Ajzen, 1991; Fishbein & Ajzen, 1975) provides a predictive model that can demonstrate the link between beliefs, attitudes and behaviour; the present project fits well within a TPB framework, by demonstrating how people explain their attitudes in terms of perceptions and beliefs. Evidence for the causal relationship between perceptions of choice and attitudes toward the use of animals for medical research provides further support for the concept of TPB.

Whilst some views are peripheral and superficial (Eagly & Chaiken, 1993), 'Strong attitudes are central to who we are, embedded in a matrix of beliefs and emotions, and may be related to profound behaviour change' (Herzog, Rowan & Kossow, 2001, p.58). Our collective views concerning animal use can influence public policy (Herzog, et al, 2001; Nuffield Council of Bioethics, 2005). The last two studies in this thesis examine the views of scientists, animal welfare persons, and laypersons. The factors identified in previous studies (Studies 1-3) were examined in relation to the views of this sample, and between-groups differences could be explained in terms of these factors. Moreover, perhaps even more interesting was that Study 5 demonstrated that the views of scientists were no more extreme compared to laypersons than were animal welfare persons, and

that Study 6 indicated that the views of opponents of animal use were more extreme than were scientists (when compared to laypersons). That is, the attitudes of scientists who are more inclined to support animal use better represent the views of the general public than do those who are more inclined to oppose animal use, in particular in terms of attitudes toward the use of animals for medical research. It is claimed that societal attitudes are said to be changing towards a more positive regard and concern for animals and their welfare (Plous, 1993), and this may be true in terms of practices other than for medical research. However, the present project indicates that for scientists and laypersons at least, support for the use of animals for medical research does exist. This will be of interest to policy makers that are influenced by public attitudes, as well as scientists and animal welfare and animal rights groups.

### **Limitations of the present project**

One criticism of the present project relates to the problems implicit to all questionnaire studies. Always open to criticism are issues concerning, for example, whether responses are reliable and valid, whether samples are representative, whether statements are too broad, all encompassing, too biased, and so on. These are problems that occur with most research that relies on questionnaires or surveys to collect data from participants.

However, the present project did not rely alone on questionnaire data, and the series of six studies that built on and corroborated findings from each other can be seen as providing evidence for validity at least. Admittedly, samples in the six studies presented in this thesis are smaller than many large-scale surveys, however, the sample sizes are adequate and appropriate and findings may be seen as providing a general picture of attitudes toward animal use (and underlying factors) of people living in the UK. The present project did not rely on one questionnaire; the measuring tools used were developed throughout the project based on findings and feedback from participants and according to the needs of each specific study. For example, the questionnaire used in Studies 1 and 5 attempted

to be thorough in that it measured attitudes towards a range of different types of animal use, comprising statements that had been developed by previous researchers and proposed as valid and reliable (Armstrong & Hutchins, 1996; Mathews & Herzog, 1997). However, this resulted in participants reporting that questions that were sometimes too broad, for example, in Study 1 questions asked about attitudes toward the use of 'animals' rather than specific types of animals, and thus participants commented that their views on animal use differed depending upon the type of animal in question. As a result, the questionnaire used in Study 5 incorporated 'type of animals' as a between-subjects factor.

It is proposed that whilst questionnaires do provide a general picture of people's views, subtleties and variation may be missed, for example, in terms of measuring attitudes toward different types of animal use. Because a complex variety of factors influence attitudes towards animal use, including factors relating to the use itself, it is important to be very clear about the type of use in question. For example, using animals for research could refer to a range of practices from inducing terminal diseases in order to test potential treatments, to examining psychological processes such as maternal or social deprivation, to observing animals in their natural habitat with no 'artificial' intervention from humans. Thus, attitudes are likely to vary expansively and so research examining views towards such practices must be clear in terms of what they are aiming to measure. The present project aimed to overcome these kinds of problems by using a mix of data collection methods, for instance participant-led interviews in Study 2 allowed for issues perceived as important by participants to be discussed rather than constructs generated by the researcher. Furthermore, later studies in this series of six became more narrow and specific, for example Study 6 focused on attitudes toward the use of animals only for medical research, rather than attempting to examine participants' views on a number of animal use practices.

One last point that needs to be noted in terms of methodological difficulties in the present project related to the recruitment of scientists as participants. Recruitment was aided by organisations that support the use of animals in science, but the response rate was low in both Studies 5 and 6, and data collection took long periods of time before samples were sufficient in size. One reason for recruitment difficulties might be that scientists are often understandably cautious about participating in research due to the risk of criticism and attack from their opponents. However, the findings from this project indicate that it is opponents of animal use that are more extreme in their views compared to the majority, rather than scientists. Thus it may be advantageous for scientists to be more open to those seeking to examine their views; only by participating in such research can their voice be heard.

## **Conclusions**

There are many reasons why animal use is an important topic to consider, since animals play a significant role in our society. We use animals for companionship, for entertainment, for financial gain, and animal bi-products are found in our food and clothing, and in cosmetics, cleaning products, paints, plastics, textiles, machinery oils, and so on (Plous, 1993). Yet whilst many factors that underlie attitudes toward animal use are psychological in nature and therefore legitimate topics for psychological research, social scientists have only just begun to explore the origins of these attitudes (Matthews & Herzog, 1997; Plous, 1993). Moreover, "The study of human-animal relationships historically has been ignored and continues to resist attention" (Melson, 2002, p.347). The present PhD project addresses attitudes toward animal use and identifies psychological factors underlying these views. All six studies presented in this thesis indicate that attitudes can best be explained in terms of underlying perceptions and beliefs, whilst other factors such as gender, empathy and value systems also have a significant, but small, impact on people's views. Disparate views, within-subjects and between-subjects, can be explained

in terms of : (i) differences in underlying factors, most significantly perceptions and beliefs concerning animals and animal use, and (ii) the varying weightings of these factors. This area of research will be relevant to social scientists interested in the basis and nature of attitudes and attitude change, and those who are interested in and affected by people's opinions concerning animal use.



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## **APPENDICES**

## APPENDIX I

### STUDY 1: EXTENDED METHOD SECTION

#### Participants

A convenience sample of 96 participants took part (41 males, 55 females), with an average age of 39.32 years ( $SD = 13.90$ ) overall (males 42.61 years,  $SD = 15.20$ , females 36.87 years,  $SD = 12.40$ ). Sixty-three (65.6%) participants owned a pet at the time of completing the questionnaire, 33 (34.4%) did not, whilst 89 (92.7%) participants had owned a pet in the past. That is, 7 (7.3%) participants had never owned a pet. Whilst no predictions were made regarding a relationship between type of pets/ animals owned or especially liked or disliked and attitudes towards animal use, this relationship was explored. However, MANOVA's revealed no significant multivariate effects.

With regards to eating meat, 85 (88.5%) participants were meat-eaters (88.5%) and 11 non-meat-eaters (11.5%). Of those who did not eat meat, nine were female, two male.

In response to a 7-point Likert scale asking for political preference of participants (from very left-wing to very right-wing), 13 (13.5%) responded on the scale between left-wing and somewhat left-wing, 27 (28.1%) between somewhat to very right-wing, whilst 56 (58.3%) responded to 'neutral'. In terms of political parties supported, 32 (33.3%) responded Conservative, 16 (16.7%) Labour, 16 (16.7%) Liberal Democrat, and 3 (3.1%) Green Party, and 3 (3.1%) Referendum. The remaining 26 (27.1%) participants responded 'none', i.e. they were not inclined to support any political party.

Participants' backgrounds in terms of where they grew up (in response to a 7-point Likert scale from very rural to very urban), led to 35 (36.4%)

responding between very rural and somewhat rural, 34 (35.4%) somewhat urban and very urban, and 27 (28.2%) responding to the 'neutral' option.

At this stage it should be noted that although this sample is diverse it cannot be considered random, nor is it representative of the general population. For example 33% of participants were Conservative party supporters, yet in Britain at this time we have a Labour government. Accordingly, thus results are descriptive of this particular sample.

### Design

A questionnaire design was used for this study. The first part of the questionnaire measured participant variables, i.e. age, gender, experience of animals (in terms of pet ownership and types of pets), whether participants ate meat or not, political stance, and type of area in which participants grew up (i.e. urban or rural). The second part of the questionnaire opened with 15 general statements measuring 'human uses and relationships with animals' (taken from Armstrong & Hutchins, 1996), followed by 31 statements that covered six types of animal use (taken from Armstrong & Hutchins, 1996, and Matthews & Herzog, 1997, plus two of researchers own statements- see Appendix II for details). Animal use categories were animal experimentation, classroom use, entertainment, personal decoration, animal management, and financial gain. There were also four statements measuring 'belief in animal mind' (taken from Hills, 1996).

Since original items were from American research, the wording of some statements was changed as perceived appropriate for a largely British sample, and the structure of some the statements was changed from negative to positive, or vice versa, in order to construct a questionnaire with a fairly equal balance of positive and negative statements. The resulting questionnaire led to 50 statements, all of which participants responded to on a 7-point Likert scale (from strongly disagree to strongly

agree). The questionnaire ended by asking what type of pets the participant especially liked and disliked, and what type of animals the participant especially liked and disliked. A pilot study was conducted with participants ( $n=10$ ) who were told that a questionnaire had been designed but had not yet been used, and that they were to help with the development of the questionnaire by identifying any problems that may exist. They were asked to complete the questionnaire *and* to write down comments on the questionnaire whenever they felt necessary. For example, if they had problems understanding statements or found statements ambiguous. This led to a change in six of the statements that were consistently identified by participants as difficult to understand or ambiguous in their meaning.

### Procedure

A convenience sample of people in public places in the Portsmouth area (i.e. the local shopping precinct and ferry terminals) were asked to complete the questionnaire measuring attitudes towards animal use and belief in animal mind (approximately three out of four of those approached chose not to participate). The experimenter aimed for a fairly equal distribution of gender, and a wide age-range (with a minimum age of 18 years, in order to avoid problems with informed consent). Completing the questionnaire took between 10-20 minutes.

### Coding

Statements were coded so that the higher the score, the more support for animal use and higher levels of belief in animal mind.

### Examining the reliability of the questionnaire

To test for reliability Cronbach's alpha was calculated to measure the internal consistency of each category. Internal consistency was high for all of the categories: general (Cronbach's alpha = .85), belief in animal mind (Cronbach's alpha = .62), experimentation (Cronbach's alpha = .88),

classroom use (Cronbach's alpha = .74), personal decoration (Cronbach's alpha = .85), entertainment (Cronbach's alpha = .70), animal management (Cronbach's alpha = .77), and financial gain (Cronbach's alpha = .67).

Correlations between animal use categories

To examine whether there was a relationship between the specific forms of animal use, Pearson's correlations were conducted (see Table 1). High correlations between all categories indicated strong relationships between attitudes towards different ways in which animals are used<sup>1</sup>.

Table 1. Correlations between specific forms of animal use

	Experimentation	Classroom	Personal decoration	Entertainment	Management
Experimentation					
Classroom	.70**				
Personal	.63**	.52**			
decoration					
Entertainment	.50**	.56**	.68**		
Management	.63**	.58**	.60**	.63**	
Financial	.66**	.50**	.65**	.61**	.56**
gain					

\*\* Correlation is significant at the 0.01 level (2-tailed).

## **APPENDIX II**

### **STUDY 1: QUESTIONNAIRE**



## ATTITUDES TOWARDS ANIMALS

Thank you for agreeing to take the time to complete this questionnaire. Your answers will help research at the University of Portsmouth examine peoples attitudes towards animal in our society. The questionnaire should take about ten minutes to fill-in. Please take your time and answer honestly- there are no right or wrong answers, only your valued opinion. All responses are anonymous and confidential.

PLEASE ENTER YOUR PERSONAL DETAILS BELOW

How old are you? .....

Gender (please circle):      Male                      Female

Do you currently own a pet (please circle)?                      Yes                      No

If so, what animal/s do you own?

.....

Have you owned pets in the past (please circle)?      Yes      No

**If so, what kind of animals did you own?**

.....

Are you a vegetarian?                      Yes                      No

Please circle the scale below to indicate your preferred political stance  
(with 1 = very left-wing, 4 = mid-way between left-wing and right-wing, 7 =  
very right-wing):

1      2      3      4      5      6      7

**Very left-wing**

Very right-wing

Which political party are you most inclined to support (please circle)?

Conservative      Green      Labour      Referendum

## Liberal Democrat

Other

None

Please circle the scale below to show whether you grew up in a mostly rural or mostly urban area (with 1 = very rural, 4 = mid-way between rural and urban, 7 = very urban)

1      2      3      4      5      6      7

PLEASE RESPOND TO ALL OF THE FOLLOWING STATEMENTS BY INDICATING YOUR LEVEL OF AGREEMENT WITH EACH STATEMENT (-3 = Strongly disagree, -2 = Somewhat disagree, -1 = Slightly disagree, 0 = Neither agree nor disagree, +1 = Slightly agree, +2 = Somewhat agree, +3 =Strongly agree)

***For example***

The weather in England is always sunny

-3                  -2                  -1                  0                  +1                  +2                  +3  
✓

If you tick -3 it means that you totally disagree with the statement that the weather in England is always sunny. If you have no opinion about this issue then '0' would be the appropriate answer. If you agree with the statement that the weather in England is always sunny you tick +1, +2 or +3 depending on how strongly you agree. In general, the more you agree, the higher the number you tick (=1, +2, +3), whereas the stronger you disagree the lower the number you tick (-1, -2, -3).

**PLEASE TURN OVER AND RESPOND TO ALL OF THE STATEMENTS**

(Minus represents disagree, plus represents agree, 0= neither agree nor disagree)

Humans are superior to other animals

-3            -2            -1            0            +1            +2            +3

Ways in which animals are used by humans should be decided from a practical rather than an emotional standpoint

-3            -2            -1            0            +1            +2            +3

The only rights an animal has are those assigned to it by humans

-3            -2            -1            0            +1            +2            +3

There are humane ways to kill animals

-3            -2            -1            0            +1            +2            +3

If an animal of any type is allowed to be born, it should be allowed to live out its natural life

-3            -2            -1            0            +1            +2            +3

People are more important than animals

-3            -2            -1            0            +1            +2            +3

Methods that control but do not injure or kill animals should be developed

-3            -2            -1            0            +1            +2            +3

The government should fund research to find ways to reduce animal suffering

-3            -2            -1            0            +1            +2            +3

Government funds should be allocated for animal welfare societies

-3            -2            -1            0            +1            +2            +3

Animal species should have legal representation

-3            -2            -1            0            +1            +2            +3

The primary function of animal life is to benefit humans

-3            -2            -1            0            +1            +2            +3

(Minus represents disagree, plus represents agree, 0= neither agree nor disagree)

Human needs should have priority over animal needs

-3                      -2                      -1                      0                      +1                      +2                      +3

Using animals is immoral if the animal suffers in any way

-3                      -2                      -1                      0                      +1                      +2                      +3

Animals should have legal rights similar to those for humans

-3                      -2                      -1                      0                      +1                      +2                      +3

Farmers should use scarecrows/ bird-scarers rather than kill birds that damage their crops

-3                      -2                      -1                      0                      +1                      +2                      +3

Raising animals for their meat is cruel

-3                      -2                      -1                      0                      +1                      +2                      +3

Breeding animals for their skins is a legitimate use of animals

-3                      -2                      -1                      0                      +1                      +2                      +3

Foxes have a right to be protected from farmers, even if they damage their crops

-3                      -2                      -1                      0                      +1                      +2                      +3

The production of inexpensive meat justifies maintaining animals under crowded and often painful conditions

-3                      -2                      -1                      0                      +1                      +2                      +3

Battery farming chickens and hens is okay if it makes the price of their eggs lower

-3                      -2                      -1                      0                      +1                      +2                      +3

In general, I think that human economic gain is more important than setting aside more land for wildlife

-3                      -2                      -1                      0                      +1                      +2                      +3

New medical procedures should be tried on animals before they are tried on humans

-3                      -2                      -1                      0                      +1                      +2                      +3

(Minus represents disagree, plus represents agree, 0= neither agree nor disagree)

Much of scientific research done with animals is unnecessary and cruel

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

Experimentation with animals is cruel, even if it saves human lives

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

Continued research with animals will be necessary if we are to ever conquer diseases such as cancer, heart disease and AIDS

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

I support university research that is done with animals if it does not cause distress, pain or death to the animal

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

Students should be given alternatives to using real animals for dissection

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

It is cruel to use and dispose of live microscopic animals for classroom purposes

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

It is morally wrong to use animals in classrooms if the animal is harmed, distressed or injured

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

It is acceptable to cause injury, distress or death to animals in medical research if humans will benefit from this

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

It is alright to use dead animals in class laboratories if the animals were raised and killed humanely

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

In a Western society where man-made alternatives are available, it is wrong to kill animals for their fur

-3	-2	-1	0	+1	+2	+3
----	----	----	---	----	----	----

(Minus represents disagree, plus represents agree, 0= neither agree nor disagree)

Stores should sell more items such as jewellery and purses made with animal by-products

-3      -2      -1      0      +1      +2      +3

Consumers should boycott companies that routinely use animals for testing their products

-3      -2      -1      0      +1      +2      +3

Animals should be used to test personal products, such as soap, before they are marketed for people

-3      -2      -1      0      +1      +2      +3

The use of animals for human entertainment such as rodeos, bull-fighting and circuses is cruel

-3      -2      -1      0      +1      +2      +3

Zoos provide an acceptable environment for wild animals

-3      -2      -1      0      +1      +2      +3

It is morally wrong to hunt wild animals just for sport

-3      -2      -1      0      +1      +2      +3

There should be extremely stiff penalties including jail sentences for people who participate in dog-fighting and badger-baiting

-3      -2      -1      0      +1      +2      +3

Hunting is an acceptable means for controlling overpopulation in wild animals

-3      -2      -1      0      +1      +2      +3

Any bird that is a nuisance should be destroyed

-3      -2      -1      0      +1      +2      +3

Animal shelters should destroy strays because it costs money to keep them

-3      -2      -1      0      +1      +2      +3

(Minus represents disagree, plus represents agree, 0= neither agree nor disagree)

Household invaders such as mice and rats should be destroyed in and around the house

-3                      -2                      -1                      0                      +1                      +2                      +3

Wildlife in urban areas should be protected, even if it becomes a nuisance

-3                      -2                      -1                      0                      +1                      +2                      +3

Animal management should focus research on non-lethal ways to manage groups of animals

-3                      -2                      -1                      0                      +1                      +2                      +3

The slaughter of whales and dolphins should be immediately stopped even if it means some people will be out of work

-3                      -2                      -1                      0                      +1                      +2                      +3

Animals are unconscious and unaware of what is happening to them

-3                      -2                      -1                      0                      +1                      +2                      +3

Animals are capable of experiencing a range of feelings and emotions (e.g. pain, fear, contentment, maternal affection)

-3                      -2                      -1                      0                      +1                      +2                      +3

Animals are able to think to some extent to solve problems and make decisions about what to do

-3                      -2                      -1                      0                      +1                      +2                      +3

Animals are more like computer programs, i.e. mechanically responding to instinctive urges without awareness of what they are doing

-3                      -2                      -1                      0                      +1                      +2                      +3

Keeping domesticated animals as pets is a good thing to do

-3                      -2                      -1                      0                      +1                      +2                      +3

Which types of animal, if any, do you especially like?

.....  
.....

Which types of animal, if any, do you especially dislike?

.....  
.....

Which types of pets do you like?

.....  
.....

Which types of pets do you dislike?

.....  
.....

ANY COMMENTS

*Many thanks again for your help in completing this questionnaire. If you are interested in participating further in this research please speak with the researcher who collects your questionnaire.*



## **APPENDIX III**

### **STUDY 1: QUESTIONNAIRE ITEMS FOR EACH CATEGORY OF ANIMAL USE AND THEIR SOURCE**

#### **USING ANIMALS FOR MEDICAL RESEARCH**

1. New medical procedures should be tried on animals before they are tried on humans (Armstrong and Hutchins, 1996)
2. Much of scientific research done with animals is unnecessary and cruel (Matthews and Herzog, 1997)
3. Experimentation with animals is cruel, even if it saves human lives (Armstrong and Hutchins, 1996)
4. Continued research with animals will be necessary if we are to ever conquer diseases such as cancer, heart disease and AIDS (Matthews and Herzog, 1997)
5. It is acceptable to cause injury, distress or death to animals in research even if humans do not benefit from this (Armstrong and Hutchins, 1996)

#### **USING ANIMALS IN THE CLASSROOM**

1. I support university research that is done with animals if it does not cause distress, pain or death to the animal (Armstrong and Hutchins, 1996)
2. Students should be given alternatives to using real animals for dissection (Armstrong and Hutchins, 1996)
3. It is cruel to use and dispose of live microscopic animals for classroom purposes (Armstrong and Hutchins, 1996)
4. It is morally wrong to use animals in classrooms if the animal is harmed, distressed or injured (Armstrong and Hutchins, 1996)
5. It is alright to use dead animals in class laboratories if the animals were raised and killed humanely (Armstrong and Hutchins, 1996)

## **USING ANIMALS FOR PERSONAL DECORATION**

1. In a Western society where man-made alternatives are available, it is wrong to kill animals for their fur (Armstrong and Hutchins, 1996)
2. Stores should sell more items such as jewellery and purses made with animal by-products (Armstrong and Hutchins, 1996)
3. Consumers should boycott companies that routinely use animals for testing their products (Armstrong and Hutchins, 1996)
4. Animals should be used to test personal products, such as soap, before they are marketed for people (Armstrong and Hutchins, 1996)
5. Breeding animals for their skins is a legitimate use of animals (Matthews and Herzog, 1997)

## **USING ANIMALS FOR ENTERTAINMENT**

1. The use of animals for human entertainment such as rodeos, bull-fighting and circuses is cruel (Matthews and Herzog, 1997)
2. Zoos provide an acceptable environment for wild animals (Matthews and Herzog, 1997)
3. It is morally wrong to hunt wild animals just for sport (Matthews and Herzog, 1997)
4. There should be extremely harsh penalties including jail sentences for people who participate in dog-fighting and badger-baiting (Matthews and Herzog, 1997)

## **ANIMAL MANAGEMENT**

1. Hunting is an acceptable means for controlling overpopulation in wild animals (Armstrong and Hutchins, 1996)
2. Any bird that is a nuisance should be destroyed (Armstrong and Hutchins, 1996)
3. Household invaders such as mice and rats should be destroyed when in the house (Armstrong and Hutchins, 1996)

4. Wildlife in urban areas should be protected, even if it becomes a nuisance (Armstrong and Hutchins, 1996)
5. Animal management should focus research on non-lethal ways to manage groups of animals (Armstrong and Hutchins, 1996)
6. Farmers should use scarecrows/ bird-scarers rather than kill birds that damage their crops (Armstrong and Hutchins, 1996)

### **USING ANIMALS FOR FINANCIAL GAIN**

1. Animal shelters should destroy stray animals because it costs money to keep them (Armstrong and Hutchins, 1996)
2. In general, I think that human economic gain is more important than setting aside more land for wildlife (Matthews and Herzog, 1997)
3. The slaughter of whales and dolphins should be immediately stopped even if it means some people will be out of work (Matthews and Herzog, 1997)
4. The production of inexpensive meat justifies maintaining animals under crowded and often painful conditions (Matthews and Herzog, 1997)
5. Battery farming chickens and hens is okay if it makes the price of their eggs lower (researchers own)
6. Foxes have a right to be protected from farmers, even if they damage their crops (Armstrong and Hutchins, 1996)

### **BELIEF IN ANIMAL MIND**

1. Most animals are unaware of what is happening to them (Hills, 1995)
2. Most animals are capable of experiencing a range of feelings and emotions (e.g. pain, fear, contentment, maternal affection) (Hills, 1995)
3. Most animals are able to think to some extent to solve problems and make decisions about what to do (Hills, 1995)
4. Most animals are more like computer programs, i.e. mechanically responding to instinctive urges without awareness of what they are doing (Hills, 1995)

## APPENDIX IV

### STUDY 2: EXTENDED METHOD AND ANALYSIS SECTION

#### Participants

Herzog (1993) claimed that qualitative research methods can be used to study smaller samples (usually between 10-20 participants) more intensively, where participants are selected on the basis of their familiarity with the interview topic and ability to describe their experiences rather than the usual method of random sampling. Sampling was purposive (see Patton, 1990), with an aim to illuminating the study question and increasing the richness of data, rather than representativeness (Zyznski et al., 1992). In the present study a convenience sample of 17 participants were recruited via a snowball method. The first three participants were known to friends of the researcher- one was involved in conservation but had no pets, one had pets, was involved with animals and involved with animal use in terms of pheasant shooting, and one had no pets and no known involvement with animals. These first three participants provided contact names of other people who might participate, and other people known to the researcher were also asked for similar contacts. Theoretical sampling led to a group of participants who had a range of involvement with animals or animal use. These included a teacher, a midwife, a caterer, two conservationists, a zoo keeper, two persons involved in pheasant shooting, an animal psychologist, and people with no particular involvement with animals. There were 9 males, 8 females, with an age range between 22-65 years (mean 41.29, SD 11.25). The sample size was dictated by the concept of saturation; the researcher continued to interview participants until it was clear that interviews were not eliciting new knowledge or understanding. When this was evident, two more interviews were conducted to confirm this, and no further participants were sought. Only one of the participants was vegetarian, ten owned a pet at the time of filling in the study, 16 had had pets in the past. Three supported the

Conservative party, three Labour, six Liberal democrats and five had no political preference.

### The interviews

All interviews were semi-structured in that the researcher had a list of items to cover, i.e. a protocol. A 'general interview guide approach' (Patton, 1990) was adopted, where participants were asked about a set of topics, the format of which was flexible. The initial items on the protocol were to discuss the following:

- different attitudes towards different uses covered by questionnaire,
- other ways in which animals are used perceived to be important,
- uses of different types of animals,
- experience of animals (e.g. pets, hobbies, work) and quality of experience,
- animals especially liked and disliked,
- animal mind- different mental states and abilities and different animals.

It was hoped that many of these items would be discussed spontaneously by participants rather than the researcher asking specific questions about the items, and it emerged that this was the case- often topics were raised by participants without the need for prompting. Participants were encouraged to lead the interview and discuss issues that they perceived as important and relevant. Lofland and Lofland (1983) refer to this as 'directed conversation' where participants are encouraged to talk freely, to lead the conversation. The aim was to encourage participants to think about animal use issues and discuss their thoughts in depth, exploring issues raised by the researcher whilst generating new insight by allowing participants to introduce new issues and ideas. As is accepted in qualitative methods (Herzog, 1993), when new issues or ideas were raised by participants that were not yet included in the interview protocol, these

were added to this protocol so that subsequent participants were encouraged to discuss these matters. These new issues were as follows:

- animal farming issues,
- knowledge of animal uses,
- perceived costs and benefits of animal use,
- physical characteristics of animals,
- knowledge of animals,
- sources of knowledge about animals,
- attitudes and beliefs concerning birds, fish and farm animals.

All interviews started with a similar introduction and starting question, by asking participants whether they had different attitudes towards different ways in which animals are used. Interviews ended when the participant had nothing left to add and the researcher could generate no further questions. Each interview lasting between 45-90 minutes (not including the time it took to complete the questionnaire), and were conducted at a time and place most convenient to the participant.

### Preparation for analysis

All interviews were transcribed verbatim, with double spacing and wide margins for notes during coding, this resulted in 274 pages of transcripts. Each participant was given a number code and each line of the text was numbered in order to facilitate location and indexing when necessary (as suggested by Nunkoosing & Phillips, 1999).

### Constant comparative methods

A central feature of qualitative methods is that of comparison. Constant comparative methods highlight similarities and differences within the text resulting in abstract categories and properties, with low level categories emerging at early stages of data collection, and higher level, 'overriding and integrating' conceptualisations emerging later in the analysis (Glaser & Strauss, 1967). This method requires data to be constantly compared

and reduced into properties, concepts, codes and categories until saturation is achieved. Emerging relationships between these factors, and the factors themselves, are based on constant comparisons between small chunks of data. If a researcher wishes to generate theoretical ideas he cannot be confined to the practice of coding first and analysing later since he needs to constantly redesign and reintegrate theoretical notions as he reviews his material (Glaser & Strauss, 1967). The constant comparative approach is a continuous process, from initial data collection to the final writing up of a research study. Concerned with generating and plausibly suggesting (but not provisionally testing) many categories, properties, and hypotheses about general problems, it can result in an integrated model that represents the researchers data. There are four stages to the constant comparative method (see Glaser & Strauss, 1967, for more details) which are summarised as follows: (i) comparing incidents applicable to each category, where each incident is coded into as many categories of analysis as possible; (ii) integrating categories and their properties, that is, as coding continues constant comparisons indicate similarities and differences that enable categorisation of units; (iii) delimiting the theory, in terms removing irrelevant properties, integrating and elaborating details of properties, and reduction in terms of identifying higher themes and enabling a formal model to emerge; and (iv) writing the theory- that is forming a substantive theory, that it is an accurate statement of what has been studied.

### Overview of analysis

The grounded theory method of constant comparative analysis (e.g. Glaser & Strauss, 1967; Strauss & Corbin, 1990; Turner, 1981) was used to understand people's personal theories of how they thought and felt about animals and animal use and what influenced these theories. Common themes, patterns and relationships were identified as well as differences between views and ideas relating to animals and animal use. Each transcript was read carefully a number of times, then each word, line

and paragraph was examined in order to code text into smaller chunks (i.e. 'open coding'). The aim at this stage was to preserve the voice of the participants; therefore labels were based on actual language used by participants in order to stay close to the data. Each chunk was examined with the question 'what does this represent?' in mind, and each incident compared with those before and after it. When all the text had been allocated descriptive codes, these codes were grouped into categories, and similarities, differences, relationships and patterns were noted as they emerged. These processes required the reading and re-reading of transcripts, and memos of issues that arose and ideas that emerged throughout the whole process were recorded. Such memos kept in the form of a manuscript<sup>1</sup>, together with fieldnotes and notes in the margins of the transcripts, provided the basis of the write-up of results<sup>2</sup>. Thus a 'paper trail' from data collection to analysis is kept as a record. Memo writing provides an immediate illustration for an idea, and since an incident can be coded for several categories, it forces the researcher to use an incident as an illustration only once. This corrects the tendency to use the same illustration over again for different properties (Glaser & Strauss, 1967).

It is important to note that when these stages of the process are perceived to be complete (although qualitative data analysis is never complete in the sense that no further analysis can be conducted), the analysis was not yet over since the action of writing up the findings is also part of the analysis process where new ideas relating to the developing theory can emerge. If new ideas do emerge at this stage then it is necessary that the researcher returns to the text and once again seeks data that confirms and/ or

---

<sup>1</sup> Grounded theory practitioners strongly advise that whenever ideas and thoughts occur to the researcher throughout the research, these ideas must be explored and recorded in full *at the time at which they occur* (e.g. Strauss & Corbin, 1991). This allows the researcher to follow through his/her thoughts to their most logical (i.e. grounded in the data) conclusions (Glaser & Strauss, 1967).

<sup>2</sup> The generation of theory requires that the data be taken apart, so when memos are rearranged for writing up, the story can be sufficiently fractured whilst appropriate illustrations are kept (Glaser & Strauss, 1967).



disconfirms such ideas (Strauss & Corbin, 1991). Thus the theory will remain grounded in the data.

### Analysis techniques

Described below are the techniques used in this research to analyse the interview data. However, whilst the method of analysis is here described under four subheadings, it may be more helpful to see all of these techniques as a *process*, as the researcher was required to constantly switch between techniques, making memos and following ideas and often using more than one technique simultaneously. For example, as open coding progressed, overarching concepts became evident, and as categorisation took place, relationships and patterns began to surface. Thus, the techniques described below were not carried out in a step-by-step, linear fashion, rather all these techniques formed a dynamic process of analysis that enabled the developing theory to emerge. The elements of theory generated from comparative analysis are, first, conceptual categories and their conceptual properties, and second, hypotheses or generalized relations between the categories and their properties (Glaser & Strauss, 1967).

### Open coding

Each line of every transcript was read and different coloured highlighter pens were used to divide text into meaningful 'chunks'. Sometimes this involved identifying one chunk per sentence, whilst other times two or more sentences were put together when they were seen as representing one factor, or one sentence was broken down into more than one chunk. For example, the sentence below was highlighted in one colour (i.e. one chunk) and given the initial title 'animal mind - insects versus mammals': *"It makes you wonder about insects, insects may perhaps respond automatically, but I don't think mammals do."* (P1, 1.449-451). However, three colours were used to chunk the following sentence into three chunks:

*"The natural emotional response, taking the naivety of the children and asking why they like the animals- well they like to cuddle them so they like the furry ones, and the unusual coloured ones, guinea pigs or whatever."* (P8, 1.226-229). These three chunks describing the appeal of animals related to contact with animals (*"...they like to cuddle them..."*), the feel of animals (*"...so they like the furry ones..."*), and the colour (*"...and the unusual coloured ones..."*). (Later, the latter two were categorised under one heading as 'Physical characteristics').

Each incident was compared with those before and after it, and notes were made in margins of any ideas that occurred to the researcher relating to the data.

### *Identifying categories and properties*

Each chunk was now examined for meaning as the researcher asked "what does this mean or represent?". Notes were made in the margins for possible titles that encapsulated what each chunk was perceived to represent in order to categorise the data. For example, when discussing animal experimentation, one participant said: *"... there must be other ways, I guess, or more time should be spent on seeking other ways of doing research."* (P8, line 48-49). This chunk was entitled 'seeking alternatives to research' in the margin of the transcript. These notes led to the identification of categories and their properties, a category being a conceptual element of a theory, a property being the conceptual element of a category (Glaser & Strauss, 1967).

When describing the concepts and properties identified, evidence was sought to support each step of the analysis (i.e. excerpts from the scripts). At this point it became clear which concepts were most relevant (i.e. mentioned by most or all of participants) and which were not (i.e. only mentioned by one or a few). Data that was unrepresentative of the majority provided insight into similarities and differences and enabled the identification of two sub-groups. For example, all participants in one of the

subgroups (subgroup A) were not more supportive of animal experimentation compared to other types of animal use (whereas all other participants were). Examination of these scripts showed that these three participants had medical knowledge that they discussed in terms of possible alternatives to using animals for research (e.g. human volunteers, DNA). That is, medical knowledge allowed these participants to propose alternatives to animal use which led to reduced support for this. This related to 'choice', a central concept to the emerging theory, that indicated that support for animal use was high if there were no alternatives to using animals (i.e. no choice).

### Identifying patterns and relationships

Comparison of similarities and differences between groups helped generate relations between categories<sup>3</sup>. In this study, as the categorisation stage of the process went on, concepts and their properties were identified, linked together, and related to other concepts and properties, and central overarching concepts emerged. For example, the concept of 'choice' in terms of whether participants knew of alternatives to animal use, was discussed by all 17 participants, and thus became one of the central concepts to the theory. For example, as this participant expressed: *"I think if there is an alternative way to do it- if they don't have to use animals then definitely. But there are probably some things that they need to, like for cancer research, things like that, that they need to do on a living organ to know."* (P3, l. 14-18).

At this stage intervening variables and exceptions to the rule were considered, for example, in abstract terms, the researcher asked when does factor A lead to B, when does factor A only lead to B when factor C

---

<sup>3</sup> These hypotheses have the status of suggested, not tested, relations, which can be verified as much as possible during research. At earlier stages of the analysis concepts and properties often seem unrelated, however as categories and properties emerge, they develop and become related, these accumulating interrelations forming an integrated central theoretical framework- "the core of the emerging theory" (Glaser & Strauss, 1967, p40).

occurs, and when does factor A *not* lead to factor B? For example, when considering animal experimentation participants discussed the costs (e.g. animal suffering) versus the benefits (e.g. medical progress) of research- if the benefits outweighed the costs (factor A) then there was more support for experimentation (factor B). However, attitudes towards animals was an intervening factor between these- if attitudes towards animals were negative or moderate (factor C) then factor B occurred, *but* if attitudes were extremely positive towards animals then often this overrode factor B. That is if people were very fond of animals then they did not express support for experimentation even when acknowledging that the benefits outweighed the costs.

### *Delimiting the theory*

As mentioned earlier, the above three techniques form a cyclical process, and the researcher continued to read and re-read the data until saturation was reached in terms of the aims of the research and research questions being asked. That is, when that the data had been fully examined for concepts, properties, patterns and relationships, and it was apparent that no new insights (relevant to this research study) were to be revealed using these techniques, then the researcher began to write-up the findings. It was during write-up (itself an integral part of the analysis process) that it became clear that some participants differed from the majority. This led to the formation of subgroup A and B, allowing clarity of findings in terms of identifying those who were distinctly unrepresentative of the central themes and patterns that were emerging to make a model (see Results and Discussion section for more details).

## **APPENDIX V**

### **STUDY 3: QUESTIONNAIRE**

WHAT DO YOU THINK ABOUT ANIMAL USE?

People can have very different views about how animals are used by humans, and when they think about these views they often consider a range of issues. What are your views on the subject of animal use? Please read the statements below and tell us how acceptable or unacceptable you believe each type of animal use is, on a scale of 1-7 (circle or tick box).

1. In my opinion, culling animals to control their numbers is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

2. In my opinion, using poison to kill rats and mice is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

3. In my opinion, killing animals to protect crops is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

4. In my opinion, keeping animals in zoos for entertainment/ human pleasure is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

5. In my opinion, battery farming is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

6. In my opinion, fox hunting is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

7. In my opinion, deer hunting is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

8. In my opinion, using rodents for medical research is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

9. In my opinion, using cats for medical research is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

10. In my opinion, using dogs for medical research is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

11. In my opinion, using pigs for medical research is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

12. In my opinion, using monkeys for medical research is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

13. In my opinion, using guinea pigs for medical research is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

14. In my opinion, using rabbits for medical research is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

15. In my opinion, using rodents for dissection to teach students (e.g. biology) is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

16. In my opinion, using guinea pigs for dissection to teach students (e.g. biology) is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

17. In my opinion, using pigs for dissection to teach students (e.g. biology) is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

18. In my opinion, using rodents to test toiletries and cosmetics is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable



19. In my opinion, using rabbits to test toiletries and cosmetics is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

20. In my opinion, using guinea pigs to test toiletries and cosmetics is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

21. In my opinion, using cats to test toiletries and cosmetics is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

22. In my opinion, keeping big cats in zoos for entertainment/ human pleasure is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

23. In my opinion, keeping monkeys in zoos for entertainment/ human pleasure is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

24. In my opinion, keeping chimpanzees and apes in zoos for entertainment/ human pleasure purposes is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

25. In my opinion, making products (e.g. clothing, shoes, bags) from the skin/ fur of dogs is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

26. In my opinion, making products (e.g. clothing, shoes, bags) from the skin/ fur of rabbits is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

27. In my opinion, making products (e.g. clothing, shoes, bags) from the skin/ fur of mink is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

28. In my opinion, making products (e.g. clothing, shoes, bags) from the skin/ fur of cows is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

29. In my opinion, making products (e.g. clothing, shoes, bags) from the skin/ fur of pigs is...

1	2	3	4	5	6	7
Highly unacceptable	Somewhat unacceptable	Slightly unacceptable	Neutral	Slightly acceptable	Somewhat acceptable	Highly acceptable

Now please respond to each of the following statements on a scale of 1-7, depending upon the extent to which you disagree or agree with each of the statements.

1. I guess that most of the time we have to use animals because we've not got much choice

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

2. Animals are less important than human beings

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

3. All types of animals should be treated the same

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

4. Animals can think and feel

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

5. It's okay to use the types of animals that are not endangered

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

6. It's natural instinct for humans to use animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

7. I am more supportive of using animals when less attractive animals are used

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

8. Humans don't *have* to use animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

9. I would agree to using some species of animals, but not all types

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

10. Animals have given me a fright in the past

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

11. I don't know much about what actually happens to animals that are used

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

12. You can decide whether you agree with using animals by weighing up the benefits of this against the costs

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

13. I am extremely fond of animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

14. Animal use is acceptable, even if the type of animals are at risk of becoming extinct

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

15. We have to use animals- we have no choice

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

16. We can't blame what we do to animals on instinct- that's just an excuse

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

17. In my opinion, humans are more important than animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

18. If we left it to nature, populations of animals would manage each other

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

19. I do know a bit about the procedures involved in animal use

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

20. You have to consider what happens to the animals and what the end result is, then you can decide whether animal use is right or wrong

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

21. There's nothing else we can use instead of animals so we *have* to use them

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

22. I think you've got to treat all animals in equally the same way

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

23. Animals give me a lot of pleasure

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

24. Humans and animals are equally important

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

25. Animals have minds so they must be capable of thinking						
1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

26. I know about animal use procedures – what actually happens to them

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

27 I think using animals should be evaluated- think about the outcomes compared to what the animal goes through- then you can decide whether it's acceptable or not

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

28. There's nothing morally wrong with using animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

29. Using animals is a moral issue

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

29. I think animals are capable of a range of thoughts and emotions

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

30. I'm not really sure what is actually done to animals that we use

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

31. It's human nature to use animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

32. There's a moral principle in that animals can't defend themselves against animal use

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

33. I think that humans are more worthy than animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

34. God gave 'man' dominion over animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

35. You can't decide whether animal use is acceptable by simply weighing up the benefits to humans against the costs to animals- it's not that simple

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely



36. Animals can give you happiness

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

37. I would prefer to see the ugly animals being used, rather than the cuter types of animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

38. It's natural for humans to use animals for their own benefit

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

39. Animals breed in mass production so humans need to cull them if this happens

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

40. Whether we use animals should depend upon how attractive, cute or fluffy they are

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

41. Most animals are horrible

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

42. It's wrong to use animals that may be endangered

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

43. My attitudes to animal use depends on what kind of animal you're talking about- I think that using animals is okay for some species but certainly not for others

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

44. An animals appearance has nothing to do with my attitudes towards animal use

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

45. I dislike animals most animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

46. Mother nature is an expert in natural selection

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

47. Whether humans have the right to use animals- I think that's a moral issue

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

48. I've had bad experiences with animals

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

49. If the animals are endangered species, then they shouldn't be used by humans

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

50. I've had good times with animals in my life

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

51. My belief is that animals respond to most things mechanically- without any thought or emotion

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

52. We do need to control the numbers of animals, or things would get out of hand

1	2	3	4	5	6	7
I disagree completely	I disagree somewhat	I disagree slightly	Neutral	I agree slightly	I agree somewhat	I agree completely

**NOW PLEASE ENTER YOUR PERSONAL DETAILS BELOW**

Are you male or female? (please circle):                      male                      /                      female

How old are you? .....

What is your occupation?  
.....

**What educational qualifications do you have?**  
CSE/ GCSE/ O' Levels .....                      A'Levels .....                      University .....  
None .....

**Which (if any) animal-related organisations or societies are you a member of?**  
.....  
.....

**Are you involved with animals or animal use, through your work or hobbies?**  
**If so please briefly describe how.**  
.....  
.....

Do you currently own a pet (please circle)?                      Yes                      No

During your childhood, how many pets did you or your family own?  
.....

During your childhood, how many pets did you or your family own *that were important to you* in some way? .....

What type of animal/s was this?  
.....

Do you avoid eating certain foods, e.g. vegetarianism?  
Yes                      No

If you do avoid eating certain foods, please describe your reasons here  
.....  
.....  
.....

Please circle the scale below to show whether you grew up in a mostly rural or mostly urban area  
(1 = very rural, 4 = mid-way between rural and urban, 7 = very urban)

1	2	3	4	5	6	7
very rural			suburban			very urban

How would you describe the area where you live now?  
(1 = very rural, 4 = mid-way between rural and urban, 7 = very urban)

1	2	3	4	5	6	7
very rural			suburban			very urban

Please circle the scale below to indicate your preferred political stance

Labour	Liberal	Conservative	Green	Other	None
--------	---------	--------------	-------	-------	------

If your answer was 'other' for the above question, please indicate which political party you support

.....

Finally, as we said at the beginning of this questionnaire, we realise that people have different views on what they think about how animals are used. After reading this questionnaire, what do you think the people who designed this questionnaire think about animal use? Please indicate on the scale below.

The people who designed this questionnaire are

1	2	3	4	5	6	7
completely against animal use			neutral			completely in favour of animal use

***Many thanks for taking the time to complete this questionnaire- we really appreciate your help.***

## APPENDIX VI

### STUDY 4: MANIPULATING PERCEPTIONS OF CHOICE

#### The medical research (high choice) introduction

It is well known that scientists use animals, in order to test drugs and try out medical procedures. However, scientists claim that animals should not be used in this way because it is now known that animals are not similar enough to humans in their biological make-up. Therefore results of animal testing can not be applied to human beings.

Scientific investigation has tried to find alternative ways of testing drugs and medical procedures that do not involve using animals, and they have found successful ways that could be used instead of using animals. For example, computer simulation and human volunteers. Therefore, scientists propose that there are alternatives ways to test drugs and medical procedures that don't involve the use of animals.

Therefore, we do not have to use animals for medical research, because the benefits are limited because results cannot be applied to human beings, and there are alternative ways to test drugs and medical procedures that do not involve using animals.

That is, the use of animals to test drugs and medical procedures is not absolutely necessary, and scientists should no longer continue to use animals in medical research.

When filling in the questionnaire attached, please keep all of the information above in mind.

The medical research (low choice) introduction

It is well known that scientists use animals, in order to test *drugs* and to try out medical procedures. Scientists claim that animals are used in this way because they are similar to humans in their biological make-up. Results of animal testing can therefore be applied to human beings.

Scientific investigation has tried to find alternative ways of testing drugs and medical procedures that do not involve using animals, but these have been unsuccessful. Therefore, scientists propose that using animals is the only way we have to test drugs and medical procedures.

Therefore, we must use animals for medical research, because the benefits are so great (in terms of testing drugs and medical procedures) that we have no choice but to use them, and there is nothing else we could use instead of animals.

That is, the use of animals to test drugs and medical procedures is absolutely necessary, and scientists have no choice but to continue using animals in medical research.

When filling in the questionnaire attached, please keep all of the information above in mind.



The dissection (high choice) introduction

It is well known that animals are used for dissection when teaching anatomy and biology to students. However, scientists claim that animals should not be used in this way because it is now known that animals are not similar enough to humans in their biological make-up. Therefore results of dissecting animals can not be applied to human beings.

Scientific investigation has investigated alternative ways of teaching anatomy and biology that do not involve using animals, and they have found successful ways that could be used instead of using animals. For example, computer simulations and observing real-life surgery. Therefore, scientists propose that there are alternative ways to teach subjects such as anatomy and biology to students that don't involve the use of animals.

Therefore, we do not have to dissect animals in teaching, because the benefits are limited because results cannot be applied to human beings, and there are alternative ways to teach anatomy and biology that do not involve using animals.

That is, the dissection of animals to teach anatomy and biology is not absolutely necessary, and we should no longer continue to dissect animals in teaching.

When filling in the questionnaire attached, please keep all of the information above in mind.

### The dissection (low choice) introduction

It is well known that animals are used for dissection, when teaching anatomy and biology to students. Scientists claim that animals are used in this way because they are similar to humans in their biological make-up. What is learnt about animals during dissection can therefore be applied to human beings.

Scientific investigation has tried to find alternative ways of teaching anatomy and biology that do not involve using animals, but these have been unsuccessful. Therefore, scientists claim that using animals is the only way we have to teach subjects such as anatomy and biology to students.

Therefore, we must dissect animals in teaching, because the benefits are so great (in terms of knowledge and understanding) that we have no choice but to use them, and there is nothing else we could use instead of animals.

That is, the dissection of animals to teach anatomy and biology is absolutely necessary, and we have no choice but to continue to dissect animals in teaching.

When filling in the questionnaire attached, please keep all of the information above in mind.

**APPENDIX VII**  
**STUDY 5: QUESTIONNAIRE**

Title of research: Attitudes and beliefs about animals and animal use  
Purpose of research: PhD  
Investigators: Sarah Knight, BSc., Professor Aldert Vrij, and Dr. Kim Bard.

This research is part of a series of studies that examine peoples’ opinions about how animals are used. The project is being conducted at the University of Portsmouth. If you agree to take part you will complete the questionnaire attached. This requires you to provide some personal details (*not* your name), and then respond to statements measuring your attitudes toward animals and different ways in which animals are used. The questionnaire will take approximately 20 minutes to complete. After you have answered all the questions, information is provided concerning how you can contact a researcher if you wish to know more about this project. All responses are anonymous, and all data will be kept in a secure place at the University of Portsmouth.

***PLEASE READ THE FOLLOWING AND INDICATE WITH A TICK AT THE BOTTOM OF THE FORM IF YOU AGREE***

- I understand that this questionnaire will take about 20 minutes to complete.
- I understand that I may choose not answer any of the questions.
- I understand that participation in this study is anonymous.
- I understand that since my name is not included on the questionnaire, the researcher will have no way of knowing that this is my questionnaire. Therefore, once the questionnaire and this consent form have been returned to the researcher, I will not be able to withdraw my data from the study.
- I understand that findings will be used as part of a postgraduate research project and may be included in publications.

I agree to participate in this study.

Please tick here if you agree to all of the above .....

Date .....

**ANIMAL USE AND ANIMAL MIND QUESTIONNAIRE**

Thank you for agreeing to take the time to complete this questionnaire. Please read each question carefully and answer honestly- there are no right or wrong answers, only your valued opinion. All responses are anonymous and confidential.

**PLEASE ENTER YOUR PERSONAL DETAILS BELOW**

Gender (please circle):      male / female

How old are you? .....

What is your highest educational qualification (please tick one):

CSE/ GCSE/ O' Levels .....	A'Levels .....
University .....	None .....

Which (if any) animal-related organisations or societies are you a member of?

.....  
.....

Are you involved in the use of animals through your work or hobbies? If so, please describe briefly below

.....  
.....  
.....

Do you currently own a pet (please circle)?                      Yes                      No

During your childhood, how many pets did you or your family own?

.....

During your childhood, how many pets did you or your family own *that were important to you* in some way? .....

What type of animal/s were these?

.....

Are you a vegetarian on ethical grounds?                      Yes                      No

If you do not eat meat for other reasons, please describe your reasons here

.....  
.....  
.....

Please circle the scale below to show whether you grew up in a mostly rural or mostly urban area

(1 = very rural, 4 = mid-way between rural and urban, 7 = very urban)

1       2       3       4       5       6       7

How would you describe the area where you now live?

(1 = very rural, 4 = mid-way between rural and urban, 7 = very urban)

1       2       3       4       5       6       7

**ATTITUDES TOWARDS ANIMAL USE: PART ONE**

We are interested in which types of animals you think of when you are asked about animals used for medical research. Please respond to the following statements by showing how much you agree or disagree with each one (circle the response that most represents your opinion).

In your opinion, compared to other animals how much are chimpanzees and monkeys used as medical research animals?

1	2	3	4	5	6	7
very much			neutral			not at all

In your opinion, compared to other animals how much are dogs and cats used as medical research animals?

1	2	3	4	5	6	7
very much			neutral			not at all

In your opinion, compared to other animals how much are rats and mice used as medical research animals?

1	2	3	4	5	6	7
very much			neutral			not at all

In your opinion, compared to other animals how much are rabbits and guinea pigs used as medical research animals?

1                      2                      3                      4                      5                      6                      7  
very much                      neutral                      not at all

## ATTITUDES TOWARDS ANIMAL USE: PART TWO

Please tell us what you think about different species in terms of their mental characteristics. Please indicate which you think is the most accurate statement concerning abilities or attributes of each of the species listed below. Do this by writing the appropriate number in the blank space *next to all of the species*.

For example, if you believe that all the animals except fish possess human-like intelligence, you would respond like this:

Typically, how intelligent do you think each of the following animals is?

1. possess no intelligence
2. possess little intelligence
3. possess moderate intelligence
4. possess a great deal of intelligence, but less than humans
5. possess human-like intelligence
6. don't know

pigs ---5---	rabbits ---5---	sheep ---5---	fish----1---
birds ---5---	cows ---5---	guinea pigs ---5---	rats ---5---
mice ---5---	chimpanzees ---5---	monkeys ---5---	

THE ABOVE IS AN EXAMPLE ONLY- NOW TELL US WHAT YOU THINK ABOUT ANIMALS BY ANSWERING ALL OF THE FOLLOWING QUESTIONS.

- I. In your opinion, typically, how capable of experiencing pain are each of the following animals?

1. no capacity to experience pain
2. little capacity to experience pain
3. moderate capacity to experience pain
4. high capacity to experience pain
5. human-like capacity to experience pain
6. don't know

pigs -----	rabbits -----	sheep -----	fish-----
cats -----	birds -----	monkeys -----	cows -----
guinea pigs -----	rats -----	mice -----	dogs -----
			chimpanzees ---

II. In your opinion, typically, how intelligent do you think each of the following species is?

- 1. possess no intelligence
- 2. possess little intelligence
- 3. possess moderate intelligence
- 4. possess a great deal of intelligence, but less than humans
- 5. possess human-like intelligence
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

---

III. In your opinion, typically, how attractive do you find each of the following animals?

- 1. ugly
- 2. unattractive
- 3. moderately attractive
- 4. very attractive
- 5. beautiful
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

---

IV. In your opinion, typically, to what degree are the following animals capable of 'consciousness' (mental experiences similar to humans)?

- 1. no consciousness
- 2. little consciousness
- 3. moderate consciousness
- 4. high consciousness
- 5. human-like consciousness
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

---



V. Typically, how much do you like each of the following animals?

- 1. extreme dislike
- 2. moderate dislike
- 3. neutral
- 4. moderate like
- 5. extreme like
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

---

VI. In your opinion, typically, to what extent do animals feel emotions such as joy, anger, and sadness?

- 1. no capacity for feeling emotions
- 2. little capacity for feeling emotions
- 3. moderate capacity for feeling emotions
- 4. high capacity for feeling emotions
- 5. human-like capacity for feeling emotions
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

---

VII. In your opinion, typically, how much do you think each of the following animals likes humans?

- 1. not at all
- 2. slightly
- 3. moderately
- 4. highly
- 5. extremely
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

---

VIII. In your opinion, typically, how much ethical consideration does each of the following species deserve?

- 1. none at all
- 2. little consideration
- 3. moderate consideration
- 4. equal consideration as humans
- 5. more consideration than humans
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

IX. In your opinion, typically, to what extent do the following animals have the capacity to reason?

- 1. no capacity for reasoning
- 2. little capacity for reasoning
- 3. moderate capacity for reasoning
- 4. high capacity for reasoning
- 5. human-like capacity for reasoning
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

X. In your opinion, typically, to what degree does each of the following animals possess the capacity to suffer?

- 1. no capacity to suffer
- 2. little capacity to suffer
- 3. moderate capacity to suffer
- 4. high capacity to suffer
- 5. human-like capacity to suffer
- 6. don't know

pigs -----	rabbits -----	sheep -----	fish-----	
cats -----	birds -----	monkeys -----	cows -----	
guinea pigs -----	rats -----	mice -----	dogs -----	chimpanzees ---

---

XI. In your opinion, typically, to what extent are each of the following animals self-aware?

1. no self-awareness

2. little self-awareness

3. moderate self-awareness

4. high self-awareness

5. human-like self-awareness

6. don't know

pigs -----

cats -----

guinea pigs -----

rabbits -----

birds -----

rats -----

sheep -----

monkeys -----

mice -----

fish-----

cows -----

dogs -----

chimpanzees ---

---

**ATTITUDES TOWARDS ANIMAL USE: PART THREE**

PLEASE RESPOND TO ALL OF THE FOLLOWING STATEMENTS-  
INDICATE YOUR LEVEL OF AGREEMENT WITH EACH STATEMENT  
BY PLACING A TICK NEXT TO THE RESPONSE THAT MOST  
MATCHES YOUR OWN

***For example***

The weather in England is always sunny

1. Disagree strongly

2. Disagree somewhat

3. Disagree slightly

4. Neither agree nor disagree

5. Agree slightly

6. Agree somewhat

7. Agree strongly
- ✓

**The above would indicate that you disagree strongly that the weather in England is always sunny.**  
**Please do not take long responding to each question- try to record your initial response to each statement**

*NOTE: We apologise if some of the statements below may seem provocative and/or biased - no offence is intended, nor are the statements reflective of our own scientific perspectives. Statements may also seem repetitive at times- this is because the questionnaire is made up of statements from four pre-existing questionnaires.*

Humans are superior to rats and mice

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

The only rights rats and mice should have are those assigned to them by humans

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

If we have to kill rats and mice, then this should be done humanely

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Rats and mice should be allowed to live out their natural lives

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

People are more important than rats and mice

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Methods that control populations of animals, but do not injure or kill, should be developed

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

The government should fund research to find ways to reduce the suffering of rats and mice

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Government funds should be allocated for animal welfare societies concerned with the treatment of rats and mice

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

The welfare of rats and mice needs protection by the law

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

The primary function of rats and mice should be to benefit humans

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Human needs should have priority over the needs of rats and mice

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Using rats and mice is unacceptable if they suffer from this

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Rats and mice should have legal rights similar to those for humans

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Farmers should use scarecrows/ bird-scarers rather than kill birds that damage their crops

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

*In a Western society, raising rats and mice for their meat is unacceptable*

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Breeding rats and mice for their skins is a legitimate use of these animals

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Foxes have a right to be protected from farmers, even if they threaten their livestock

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

The production of inexpensive meat justifies maintaining animals under unpleasant conditions

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

The battery farming of hens is acceptable if it means that eggs will be cheaper

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

In general, I think that human economic gain is more important than setting aside more land for wildlife

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

New medical procedures should be tried on rats and mice before they are tried on humans

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Much of scientific research done with rats and mice is unnecessary

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Much of scientific research done with rats and mice is unacceptable

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

I agree with experimentation that causes pain and suffering to rats and mice if it saves human lives

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

I agree with research on rats and mice if it will conquer diseases such as cancer, Parkinsons and AIDS

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

I support university research that is done with rats and mice, ONLY if it does not cause distress or pain to the animal

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Post-graduate biology students should be given alternatives to using rats and mice for dissection

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

It is unacceptable to use rats and mice for classroom dissection purposes

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

It is unacceptable to use rats and mice in classrooms if the animal is harmed, distressed or injured

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

It is acceptable to cause injury, distress or death to rats and mice in medical research if humans will benefit from this

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly



It is acceptable to use dead rats and mice in classroom laboratories if the animals were raised and killed humanely

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

In a Western society where man-made alternatives are available, it is unacceptable to kill rats and mice for their fur

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Shops should sell more items such as jewellery and purses made with the by-products of rats and mice

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Consumers should boycott companies that routinely use rats and mice for testing cosmetics and toiletries

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Rats and mice should be used to test personal products, such as cosmetics and toiletries, before they are marketed for people

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

*The use of rats and mice for any type of human entertainment is unacceptable*

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Zoos provide an acceptable environment for most wild animals

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

It is unacceptable to hunt wild animals for sport

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

There should be extremely stiff penalties including jail sentences for people involved with dog-fighting and badger-baiting

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Hunting is an acceptable means for controlling overpopulation in wild animals

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Rats and mice that are an annoyance to humans should be destroyed

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Animal shelters should destroy stray animals because it costs money to keep them

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Household invaders such as mice and rats should be destroyed in and around the house

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Wildlife in urban areas should be protected, even if it becomes a nuisance

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Animal management should focus research on non-lethal ways to control animal populations

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

The killing of whales and dolphins should be immediately stopped, even if it means some people will be out of work

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Rats and mice are unconscious and unaware of what is happening to them

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Rats and mice are capable of experiencing a range of feelings and emotions (e.g. pain, fear, contentment, maternal affection)

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

Rats and mice are able to think to some extent to solve problems and make decisions about what to do

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

The behaviour of rats and mice is a mechanical response to instinctive urges with little awareness of what they are doing

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

## **ATTITUDES TOWARDS ANIMAL USE: PART FOUR**

Please respond to the following statements that examine your attitudes towards different ways animals are used

### **USING ANIMALS FOR MEDICAL RESEARCH (e.g. drugs testing)**

**We have to use animals for medical research because there are no alternatives**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**The benefits to humans are so great that we have no choice but to use animals in medical research**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

### **USING ANIMALS TO TEACH BIOLOGY (i.e., dissection)**

**We have to use animals when teaching people about biology because there are no alternatives**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**The benefits to humans are so great that we have no choice but to use dead animals to teach biology**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

### **USING ANIMALS FOR PERSONAL DECORATION (e.g. wearing fur, testing make-up)**

**We have to use animals for personal decoration because there are no alternatives**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**The benefits to humans are so great that we have no choice but to use animals for personal decoration**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**USING ANIMALS FOR ENTERTAINMENT (e.g. fox hunting, circuses)**

**We have to use animals for entertainment because there are no alternatives**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**The benefits to humans are so great that we have no choice but to use animals for human entertainment**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**ANIMAL MANAGEMENT (e.g. pest control)**

**There are no alternatives to killing animals that need to be controlled**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**The benefits to humans are so great that we have no choice but to kill animals that need controlling**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**USING ANIMALS FOR FINANCIAL GAIN (e.g. battery farming)**

**There are no alternatives to keeping animals in uncomfortable conditions for financial gain**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

**The financial benefits to humans are so great that we have no choice but to keep animals in uncomfortable conditions**

1. Disagree strongly
2. Disagree somewhat
3. Disagree slightly
4. Neither agree nor disagree
5. Agree slightly
6. Agree somewhat
7. Agree strongly

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Many thanks for participating in this study conducted by Sarah Knight and supervised by Professor Aldert Vrij and Dr Kim Bard- we really appreciate your help. Your questionnaire will be analysed together with questionnaires that have been completed by other people for the purpose of this study. The results will be used to inform this postgraduate project. You can contact us at Portsmouth University if you would like to know more about this study, by writing to Sarah Knight, Department of Psychology, University of Portsmouth, King Henry Building, King Henry Street II, Portsmouth, PO1 2DY, or email at [sarah.knight@port.ac.uk](mailto:sarah.knight@port.ac.uk).

**APPENDIX VIII**

**STUDY 6: ITEMS USED IN ONLINE QUESTIONNAIRE**



## **1. Attitudes toward the use of (non-human) animals by human beings**

This research aims to examine the kinds of issues people consider when thinking about their views on the use of animals for medical research. If you agree to take part you will be required to complete a questionnaire that should again take around 20 minutes to complete. At the end of the questionnaire you are given details about how you can contact researchers if you wish to know more about the project. A summary of findings will be available to all persons that take part. We do not need your name, therefore all responses are anonymous. All data will be kept in a secure place at the University of Portsmouth.

### **Please read the following:**

~ I understand that participation in this study will take around 20 minutes of my time.

~ I understand that I may decide to exit the questionnaire at any point if I do not wish to continue.

~ I understand that participation in the study is anonymous and therefore my name cannot be used in connection with the results in any way.

~ I understand that since my name is not included on the questionnaire, the researcher will have no way of knowing which is my questionnaire. Therefore once the questionnaire and this consent form have been submitted, I will not be able to withdraw my data from the study.

~ I understand that all data will be kept for a minimum of five years.

~ I understand that findings will be used as apart of a Postgraduate Research project and may be included in publications.

~ I understand that I have the right to obtain information about the findings of the study by contacting the researcher at the University of Portsmouth.

~ I agree to participate in this study.

If you agree to all of the above, please type the word 'yes' in the box below.

## **2. Personal details**

Thank you for agreeing to take the time to complete this questionnaire. Your answers will help researchers at the University of Portsmouth examine people's attitudes towards animal-related issues. The questionnaire should take around 20 minutes to complete. Please read each question carefully and answer honestly- there are no right or wrong answers, only your valued opinion.

1. Are you male or female?
2. How old are you?
3. What is your highest level of education?
4. Please describe briefly how you heard about this survey
5. If, through work or hobbies, you are involved in the use of animals in some way, please give us brief details of what this involves (with a job title if applicable).
6. Do you currently own a pet?
7. During your childhood, how many pets did you or your family own?
8. During your childhood, how many pets did you or your family own that were important to you in some way?
9. What type of animal/s were these?
10. Do you practice ethical food avoidances such as vegetarianism?

### **3. Issues to consider in relation to using animals for medical research**

The following task requires you to rate a number of issues in order of importance, in accordance with your personal opinion. You will allocate a number to each issue, with the number 1 representing the issue that you perceive to be most important, the number 2 representing the second most important issue, and so on.

#### **Example task**

Below are some issues to consider when deciding where to go for your holiday. If you believe the weather is the most important issue to consider when choosing a holiday, followed by the cost, followed by foreign culture, whilst language spoken is the least important issue to consider, then you would rate these as follows:

Foreign culture = 3

Cost = 2

Language spoken = 4

Weather = 1

Now read on for your actual task

Below there is a list of seven issues to consider when deciding whether medical research that involves the use of (non-human) animals should be allowed. Please read this list, and think about which issues you consider to be the most important, and which are least important. The aim of this task is to allocate each of the issues a different number (from 1-7) by clicking on one of the options for each issue. So... when you have decided which issue you think is most important, click on the circle in column marked '1' next to that issue, so that there is a tick to show that you believe this to be the most important issue. Then decide which is the second most important, and click the circle in column '2'. Continue this procedure until

you have filled in all eight boxes (with 1 = most important, and 7 = least important). If you change your mind at any time, feel free to make changes.

- The benefits of medical research for human beings
- An animal's right not to be used by humans
- Whether medical research causes suffering to the animals involved
- Whether there are alternatives to using animals for research
- My concern for the well-being of the animals involved
- The importance of human beings in comparison to animals
- Whether the animals involved are capable of suffering

If there are any other issues that you consider to be important that are not included in the list above, please list below

#### **4. Your views on the use of animals for medical research**

Please now indicate your level of agreement with each of the following statements, by circling the response that best reflects your opinion (all followed by a 7-point Likert scale (from strongly disagree – strongly agree))

1. New medical procedures should be tried on animals before they are tried on humans
2. Much of medical research that involves animals is cruel
3. I agree with medical research that causes pain and suffering to animals because it saves lives
4. I agree with medical research on animals if it will conquer diseases such as cancer, heart disease and AIDS
5. Much of medical research done with animals is unnecessary
6. It is acceptable to cause suffering to animals in medical research if humans will benefit from this

#### **5. About you....**

Please now rate on a scale of 1 to 5, how well each statement best describes you (circle a number between 1-5 on each of the scales below).

1. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.
2. I can really get involved with the feelings of the characters in a novel.
3. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.
4. After seeing a play or movie, I have felt as though I were one of the characters.

5. I daydream and fantasize, with some regularity, about things that might happen to me.
6. Becoming extremely involved in a good book or movie is somewhat rare for me.
7. When I watch a good movie, I can very easily put myself in the place of a leading character.
8. Before criticizing somebody, I try to imagine how I would feel if I were in their place.
9. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.
10. I sometimes try to understand my friends better by imagining how things look from their perspective.
11. I believe that there are two sides to every question and try to look at them both.
12. I sometimes find it difficult to see things from the "other guy's" point of view.
13. I try to look at everybody's side of a disagreement before I make a decision.
14. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.
15. When I see someone being taken advantage of, I feel kind of protective toward them.
16. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.
17. I often have tender, concerned feelings for people less fortunate than me.
18. I would describe myself as a pretty soft-hearted person.
19. Sometimes I don't feel sorry for other people when they are having problems.
20. Other people's misfortunes do not usually disturb me a great deal.
21. I am often quite touched by things that I see happen.
22. When I see someone who badly needs help in an emergency, I go to pieces.
23. I sometimes feel helpless when I am in the middle of a very emotional situation.
24. In emergency situations, I feel apprehensive and ill-at-ease.
25. I am usually pretty effective in dealing with emergencies.
26. Being in a tense emotional situation scares me.
27. When I see someone get hurt, I tend to remain calm.
28. I tend to lose control during emergencies.
29. When I am reading an interesting story or novel about animals, I imagine how I would feel if the events in the story were happening to me.
30. I can really get involved with the feelings of the animals in a novel.
31. After seeing a play or movie about animals, I have felt as though I were one of those animals.
32. When I watch a good movie that involves animals, I can very easily put myself in the place of one of those animals

33. Before criticizing an animal, I try to imagine how I would feel if I were in their place.
34. I sometimes try to understand animals better by imagining how things look from their perspective.
35. I sometimes find it difficult to see things from an animal's point of view.
36. When I'm upset at an animal, I usually try to "put myself in their place" for a while.
37. When I see animals being taken advantage of, I feel kind of protective toward them.
38. When I see animals being treated unfairly, I sometimes don't feel very much pity for them.
39. I often have tender, concerned feelings for animals in unfortunate situations.
40. Sometimes I don't feel sorry for animals that are having problems.
41. The misfortunes of animals do not usually disturb me a great deal.
42. When I see animals that badly needs help in an emergency, I go to pieces.
43. When I see an animal get hurt, I tend to remain calm.

#### **6. Your general values about life- the final task!**

Below there is a list of eighteen general values about life. Please read this list, and think about which you consider to be the most important, and which are least important.

The aim of this task is to allocate each of the issues a different number (from 1-18) by clicking on one of the circles alongside each value. So... when you have decided which value is most important, click on the circle in the column marked '1' next to that value, so that there is a tick to show that you believe this to be the most important issue. Then decide which is the second most important, and click the circle in column '2'. Continue this procedure until you have filled in all eighteen boxes (with 1= most important, and 18= least important).

If you change your mind at any time, feel free to make changes.

Work slowly and think carefully. If you change your mind you can change your answers at any time

#### **A COMFORTABLE LIFE**

(a prosperous life)

#### **AN EXCITING LIFE**

(a stimulating, active life)

#### **A SENSE OF ACCOMPLISHMENT**

(lasting contribution)

#### **A WORLD AT PEACE**

(free of war and conflict)

**A WORLD OF BEAUTY**

(beauty of nature and the arts)

**EQUALITY**

(equal opportunity for all)

**FAMILY SECURITY**

(taking care of loved ones)

**FREEDOM**

(independence, free choice)

**HAPPINESS**

(contentedness)

**INNER HARMONY**

(freedom from inner conflict)

**MATURE LOVE**

(sexual and spiritual intimacy)

**NATIONAL SECURITY**

(protection from attack)

**PLEASURE**

(an enjoyable, leisurely life)

**SALVATION**

(saved, eternal life)

**SELF-RESPECT**

(self-esteem)

**SOCIAL RECOGNITION**

(respect, admiration)

**TRUE FRIENDSHIP**

(close companionship)

**WISDOM**

(a mature understanding of life)

**7. The end!**

Below is another list of 18 values. Please arrange them in order of importance, as you did in the last task

**AMBITIOUS**

(hard working, aspiring)

**BROADMINDED**

(open-minded)

**CAPABLE**

(competent, effective)

**CHEERFUL**

(light-hearted, joyful)

**CLEAN**

(neat, tidy)

**COURAGEOUS**

(standing up for your beliefs)

**FORGIVING**

(willing to pardon others)

**HELPFUL**

(working for the welfare of others)

**HONEST**

(sincere, truthful)

**IMAGINATIVE**

(daring, creative)

**INDEPENDENT**

(self-reliant, self-sufficient)

**INTELLECTUAL**

(intelligent, reflective)

**LOGICAL**

(consistent, rational)

**LOVING**

(affectionate, tender)

**OBEDIENT**

(dutiful, respectful)

**POLITE**

(courteous, well-mannered)

**RESPONSIBLE**

(dependable, reliable)

**SELF-CONTROLLED**

(restrained, self-disciplined)

**OVERVIEW**

This research aims to examine the issues that people think about in relation to their views about the use of animals in medical research. It also includes a measure of empathy and a values survey. Your questionnaire will be analysed together with questionnaires that have been completed by other people for the purpose of this study. Groups of people who are involved with animal use in different ways have been invited to participate, and also people who are not involved with animal use issues. Comparisons will be made between groups. Please feel free to contact a researcher by email ([sarah.knight@port.ac.uk](mailto:sarah.knight@port.ac.uk)) if you would like a summary of the results once the study is completed. Again, many thanks for participating in this study.

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